UNCC

1980-81

GRADUATE CATALOG

Correspondence Directory

If, after reading this catalog, you have further questions, or wish to make specific inquiries about a graduate program at the University of North Carolina at Charlotte, please look below to find the proper office to contact.

Admission:	Director of Graduate Studies AC 704/597-2351
Summer Session:	Office of Academic Affairs AC 704/597-2224
Evening Program:	Office of Academic Affairs AC 704/597-2225
Continuing Education:	Director of Continuing Education AC 704/597-2424
Campus Housing:	Director of Residence Life AC 704/597-2263
Student Financial Aid:	Director of Student Financial Aid AC 704/597-2461
General Information:	Director of Information AC 704/597-2271
Emergency:	AC 704/597-2200

Address all correspondence to any of the above departments in care of:

The University of North Carolina at Charlotte
UNCC Station
Charlotte, North Carolina 28223

The University of North Carolina at Charlotte is an equal opportunity institution and subscribes to all requirements of federal law not to discriminate with respect to students, employees or applicants on the basis of sex, race, color, national origin, handicapped status, age, veteran status or religion.

The University of North Carolina at Charlotte

Graduate Catalog 1980-81 Volume X

Cover design by Carol Ostrowski
Photography by Susan Johnson

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THE UNIVERSITY

INTRODUCTION

The University of North Carolina at Charlotte is one of a large number of established but growing universities located in urban areas. The development of these new institutions near our nation's largest cities reflects the contemporary influence of urban life. The city is the laboratory of life in America today.

UNCC is located in the largest urban center of the two Carolinas. With a population of 329,000, Charlotte ranks as the largest city in the Piedmont Crescent, an area which population experts predict will become the fifth largest urban complex in the nation by the turn of the century.

UNCC offers its students the opportunities to study and become involved in the problems of life in the city. Many distinguished American universities located in isolated areas are taking students to urban centers in order that they may study the city first hand, taking advantage of the wealth of cultural opportunities available only in urban surroundings.

The University of North Carolina at Charlotte is one of the campuses of the University of North Carolina system. Thus, while the University feels free to experiment and innovate, at the same time it has the ability to draw upon the wisdom and experience of years of tradition.

MISSION STATEMENT—The University of North Carolina at Charlotte

The University of North Carolina at Charlotte and its mission evolve through the interrelationships of its faculty, staff, students and their interaction with its peculiar historic and geographic context. It affirms the classical functions of an institution of higher education to preserve, generate, transmit and apply knowledge and understanding, and to foster and support a vital spirit of open inquiry and critical thinking.

In the spirit of that tradition, the University seeks to address the issues which face all men and women who live in a rapidly changing, technological society in which persons are in ever closer contact with one another. It addresses these issues by focusing concern on the quality of life available to present and succeeding generations, a concern with three primary attachments: individuals, environments and the values which undergird society. Thus, the University is oriented around the complementary ideals of: (1) increasing the capacity of individuals to live productive, satisfying and personally rewarding lives; (2) contributing to the development of intellectual, emotional, physical and social environments in which persons are supported and affirmed; and (3) focusing attention on the ideas and values which have shaped and are shaping civilizations.

The University affirms the primacy of its obligation to assist persons in educating themselves to live productive lives through the application of practical knowledge and inquiring intellects. It recognizes its further obligations to assist people to live creatively within a framework of examined values and to live tolerantly in the knowledge that every person is inexorably joined with all other persons in the process of shaping the future.

The University likewise affirms its obligation to provide opportunities for persons to investigate and contribute to the greater understanding of our environments, construed in the broadest sense, and to encourage those developments which would enhance the quality and enjoyment of life.

Finally, the University affirms its obligation to provide opportunities for persons to examine their thoughts, attitudes and feelings in the light of the ideas and values which shape civilizations; to encourage individual involvement in the process of valuing; and to sensitize people to the importance of values in making personal and corporate decisions.

To apply itself to the tenets of its mission, the University recognizes that it must continue to involve itself with its total environment, that it must promote and protect the freedom which is essential for inquiring minds to grow and be productive, and above all, that it must assure that its own policies and practices reflect its firm belief in the value of persons.

GOALS STATEMENT–The University of North Carolina at Charlotte

The goals of The University of North Carolina at Charlotte emerge from its status as a publicly supported senior institution of higher education, the evolution of understanding of its mission, and the issues presented by its particular time and place.

The University seeks to implement its programs of instruction, research and service so that undergraduate instruction serves as the cornerstone upon which more advanced learning is based and so that the functions are interdependent and mutually supportive.

In recognition of the need to provide focus for these functions, the University has, through a variety of forums and through a continuing process of review and refinement, committed itself to address its mission and define its direction with reference to the following areas of primary concern:

I. The importance of a stimulating LEARNING ENVIRONMENT.

In its commitment to provide opportunities for the free pursuit and exchange of ideas on a variety of issues, the University recognizes that the achievement of all its goals is dependent upon the quality of the intellectual, social, psychological and physical context it provides. The University is therefore committed to develop and maintain its own community so that it is characterized by a climate which nurtures individuals engaged in open inquiry and is itself expressive of the highest goals and aspirations it has for the larger society.

In pursuing this end, the University is committed to assure that people are treated fairly and equitably under its policies and practices; that its decisions are consistent with its value commitments; that educational parochialism is discouraged;

and that artificial and unnecessary barriers between people and between ideas and disciplines are minimized. The University is further committed to present recreational activities which take into account the full range of psychological and physical developmental needs of adults.

II. The necessity for INSTITUTIONAL PLANNING, EVALUATION AND RENEWAL.

The University recognizes that the quality and vitality of its learning environment is a direct expression of the quality and vitality of its faculty and staff. Therefore, the University is committed to attract and nurture people whose personal goals can be realized in the context of this institution and whose interests and capacities can contribute to the realization of the University's goals.

In its obligation to maintain the vitality of its functions of inquiry, transmission and application of knowledge and understanding, the University recognizes that it must meet this obligation as needs, resources and knowledge itself change. Therefore, the University is committed to a continuous examination of its goals, policies, procedures and programs and their results to ensure that it remains true to its mission and responsive to its obligations to society and to those who benefit from the services it may legitimately offer. The University further recognizes that its circumstances offer an opportunity to experiment with and evaluate new means for serving the rapidly changing society. With this recognition it is committed to search actively for promising new approaches to university education.

III. The LIFE-LONG LEARNING needs of individuals.

The University recognizes that individuals need to continue to grow intellectually and emotionally throughout their lives if they are to sustain a healthy existence. As the rate of change in society and career patterns accelerates, the need for continous personal development and career and life planning will likewise increase. Therefore, the University is committed to encourage growth in individuals throughout their lives and to offer them opportunities to realize that growth. In addressing these needs, UNCC offers programs designed to assist men and women in making and implementing career decisions, in examining and clarifying personal values and life patterns and in addressing other issues commonly of personal concern to adults.

IV. The increasing INTERDEPENDENCE OF PEOPLES AND CULTURES.

The University recognizes the increasing interdependence of all peoples and cultures and the important implications this fact holds for succeeding generations. Therefore, the University is committed to provide instructional, research and service programs which are designed to advance knowledge and foster understanding of intercultural differences, similarities and interdependencies. Moreover, the University is committed to generate and transmit knowledge illuminating the framework in which peoples, cultures and nations exist and interact.

V. The relationship between MAN AND ENVIRONMENTS.

The University recognizes that man is a part of many environments but has the capacity to destroy or nurture the life-sustaining aspects of each of these. Therefore, the University is committed to assist persons in recognizing their capacity to change their environments and in becoming increasingly aware of the forces which shape their environments. Moreover, the University is committed to generate, transmit and apply knowledge bearing upon the relationships between individuals and environments and to prepare people who respond sensitively and with understanding, whether as private citizens, leaders or professionals, to the complex issues involved in maintaining the health of those relationships.

VI. The problems and opportunites presented by a RAPIDLY CHANGING, URBANIZING SOCIETY.

The University encourages the view that urbanization is a process that has implications extending far beyond the boundaries of urban centers and that the issues raised by the process transcend the physical-spatial dimensions of life.

The University is committed to the application of established methods of generating, transmitting and applying knowledge bearing upon urbanization, and it strongly encourages the development and evaluation of new approaches as new problems and opportunities emerge.

The University intends to provide programs and services of recognized excellence which address the problems and opportunities produced by the movement of major, contemporary social forces. Much of the instruction, research and public service at UNCC is designed to assist, directly or indirectly, students, professionals-in-the-field, organizations, agencies and communities to participate in and shape the processes attendant to urbanization.

HISTORY

The University of North Carolina at Charlotte was created by the North Carolina General Assembly in 1965. The legislation made Charlotte College, UNCC's predecessor institution, the fourth campus of the consolidated University of North Carolina. In 1972, the University of North Carolina system was restructured, and UNCC became one of the 16 public senior institutions composing the system.

UNCC can trace its lineage to 1946 with the establishment of the Charlotte Center of the University of North Carolina. The center became Charlotte College in 1949. Offering a junior college curriculum, the College operated under the Charlotte Board of School Commissioners until 1958 when it became a part of the North Carolina community college system. In 1963, Charlotte College became a four-year institution.

The University's present Chancellor, Dr. E. K. Fretwell Jr., took office Jan. 1, 1979, upon the retirement of Dr. D. W. Colvard.

Dr. Colvard was the University's first Chancellor, elected in 1966 — the year UNCC awarded its first baccalaureate degrees. He was made Chancellor Emeritus in January, 1979.

Dr. Bonnie E. Cone, who had brought the institution to university status as president of Charlotte College, later serving as acting chancellor, was appointed vice chancellor for student affairs and community relations when Dr. Colvard became Chancellor. She became vice chancellor emeritus on July 1, 1973, and was succeeded by Dr. Douglas M. Orr, Jr. Dr. William Hugh McEniry was appointed vice chancellor for academic affairs in 1967. Dr. McEniry died March 15, 1974, and Dr. Philip E. Hildreth was named vice chancellor for academic affairs. Dr. Hildreth resigned in 1980, and Dr. Robert D. Snyder became interim vice chancellor for academic affairs. The position of business manager was upgraded to a vice chancellorship in 1971, and Mr. Leo E. Ells was appointed to that position in 1976. A vice chancellorship for development was established (in 1971, also) and Dr. William M. Britt was appointed to the position.

To give leadership to the academic program and in the sharing of academic and planning responsibilities, division chairmen were appointed in the fall of 1968. When the University's academic divisions were converted into colleges in 1970, the division chairmen were appointed deans of their respective colleges. A director of graduate studies was named in the fall of that year. Three of the University's eight colleges were consolidated in 1980. The six colleges offering courses for the 1980-81 academic year are Architecture, Arts and Sciences, Business Administration, Engineering, Human Development and Learning, and Nursing.

THE CAMPUS

UNCC's campus is located eight miles north of downtown Charlotte on N.C. Highway 49 near its intersection with U.S. Highway 29, and adjoining Interstate 85.

The buildings stand on a rolling campus of forest, streams, ponds and fields comprising more than 1,000 acres. Distinctly contemporary in architecture and functional in use, the campus offers an attractive and comfortable setting in which the student may spend his college years. All facilities, except for some large activity areas, are air-conditioned.

ACCREDITATION

UNCC is fully accredited by the Southern Association of Colleges and Schools, the North Carolina Association of Colleges and Universities, the North Carolina Board of Nursing and the National League for Nursing. The University's education program is approved for teacher certification by the North Carolina State Department of Education. UNCC is on the approved list of the American Chemical Society, and programs within the College of Engineering are accredited by the Engineers' Council for Professional Development. The College of Architecture is accredited by the National Architectural Accrediting Board.

The University is a member of the Council of Graduate Schools in the United States and the Conference of Southern Graduate Schools.

FACULTY

A team of outstanding educators has been assembled to give leadership to a basically young and highly qualified faculty. Faculty members at UNCC have accepted the challenges presented by a growing institution. They are willing to sacrifice the stability they might have found in established universities for the satisfaction of helping to build a modern university, one which is aware of and receptive to its commitment to the wider community it serves.

DEGREES

The University of North Carolina at Charlotte is currently authorized to award the following graduate degrees:

Master of Arts
English, Geography, History, Mathematics
Master of Arts in Education
Mathematics
Master of Business Administration
Master of Human Development and Learning
Master of Science
Biology, Chemistry, Engineering
Master of Urban Administration

GRADUATE STUDY

Shortly after UNCC emerged as the fourth campus of the University of North Carolina system, the University's trustees authorized the new institution to "provide graduate and undergraduate instruction and research opportunities in the basic natural sciences, the social sciences, the humanities, the fine arts and teacher education."

The first graduate students were admitted to programs designed primarily for in-service public school teachers in the fall of 1969. These were followed by our first graduate students in business. The other programs listed have been added as resources have been made available. And under its five-year plan, "The University of North Carolina at Charlotte should give priority to providing upper-division and master's programs."

All of the graduate offerings at UNCC are designed so that persons can pursue their degree programs while continuing full-time employment. Courses are given in the late afternoon and evening and carry with them full residence credit.

THE CATALOG

The catalog is not an irrevocable contract. Regulations printed herein are subject to change by the faculty at any time. University regulations are policy statements to guide students, faculty and administrative officers in achieving the goals of the institution. Necessary interpretations of these policies will be made by the appropriate authority with the interests of the students and the institution in mind. Students are encouraged to seek information as they require it about the application of any policy.

EQUAL OPPORTUNITY

The University of North Carolina at Charlotte is dedicated to equality of opportunity within the University community. Discrimination based on sex, race, color, national origin, religion, age, handicap or veteran status is not condoned and shall not be practiced against students, employees, or applicants.

Further, the University of North Carolina at Charlotte supports the protections available to members of the university community under all applicable federal laws, including Title VI and VII of the Civil Rights Act, Title IX of the Educational Amendments, Section 799A and 845 of the Public Health Service Act, the Equal Pay and Age Discrimination Acts, the Rehabilitation Act of 1973, and Executive Order 11246.

The University has a published Affirmative Action and Equal Opportunity Plan. It has completed a self-evaluation of current policies and procedures to insure compliance with the requirements of Title IX of the Educational Amendments of 1972 and it has completed the compliance report required by Section 504 of the Rehabilitation Act of 1973. Copies of these documents have been placed on reserve in the UNCC library.

Both informal and formal grievance procedures have been established for use by any member of the University community who feels discrimination by any segment of the University.

PRIVACY OF EDUCATIONAL RECORDS

Access to student educational records is regulated by the Family Educational Rights and Privacy Act of 1974. This Act, with which the institution intends to comply fully, was designated to protect the privacy of education records, to establish the right of students to inspect and review their education records and to provide guidelines for the correction of inaccurate or misleading data through informal and formal hearings. Students also have the right to file complaints with The Family Educational Rights and Privacy Act Office (FERPA) concerning alleged failures by the institution to comply with the Act.

Local policy explains in detail the procedures to be used by the institution for compliance with the provisions of the Act. Copies of the policy can be found in the following offices: Vice Chancellor of Academic Affairs, Vice Chancellor of Student Affairs, Dean of Students and Registrar.

The University of North Carolina at Charlotte categorizes the following as Directory Information:

Name, address, telephone number, date of birth, participation in offically recognized activities and sports, weight and height of members of athletic teams, degrees and awards received, dates of attendance, major and class schedule.

Students have the right to withhold disclosure of Directory Information by completing a request for non-disclosure in the Registrar's Office. Requests for non-disclosure must be filed annually. The University of North Carolina at Charlotte assumes that failure on the part of any student to file a request for non-disclosure indicates approval for disclosure.

Questions concerning the Family Educational Rights and Privacy Act may be referred to the Registrar.

UNIVERSITY COUNSELING CENTER

The University Counseling Center offers the services of professionally trained counselors and psychologists to the University community without charge. Initial counseling appointments may be arranged in Room 06 of the Atkins Building or by calling 597-2104. All counseling interviews are treated in a confidential manner.

The aim of the Counseling Center is to help individuals to gain greater self-understanding, to deal effectively with important decisions and to resolve current problems. The counseling process is individualized for each person to meet his particular needs. It may include individual sessions with a professional counselor, group meetings, use of standardized tests of interests, aptitudes and personality characteristics, or utilization of an extensive occupational-educational library. The staff is also available for consultation to University faculty, groups and agencies.

LEARNING ASSISTANCE

The Learning Assistance Services, University of North Carolina at Charlotte, are located in two modern, attractive, well-designed labs—Atkins 24 (the Counseling Center), and the basement of Sanford Dorm. All services are available both day and night hours.

Free mini-courses, scheduled each semester, offer group instruction in General Study Skills, Listening-Notetaking, Briefhand, Speed Reading, Spelling and Vocabulary Development, Comprehension Skills, etc. Students register in Atkins 24 for the classes, which generally meet for eight sessions. Special study seminars are offered on a to-be-arranged basis. Topics offered are time management, test taking, memory techniques, GRE preparation and many others. Special interest groups are scheduled for international students, re-entering students and black perspectives in reading.

Free tutoring is available in math, biology, chemistry, physics and basic engineering. Students sign up for an individual 30-minute period of time on a first-come, first-served basis. The Writing Resource Center, sponsored by the English Department, is in the Atkins location and offers help with English grammar and composition.

Students may also drop in at any time in either lab and work individually in reading improvement, vocabulary development, comprehension and/or study skills materials. Students take the Nelson-Denny Reading Survey of Reading/Study Efficiency tests on a voluntary basis and may sign up for individual consultation with one of the lab instructors. Individual programs, based on academic skill needs identified by the two test instruments, are worked out for each student. In addition, help is available for preparation for the GRE, LSAT, MAT, and other tests.

Student information areas in both lab locations make available free handouts on many study skills.

HEALTH SERVICE

The University Health Service, housed in a building completed in 1971, is operated 24 hours a day, seven days a week during regular school terms. The building has a capacity for 14 patients, with eight semi-private rooms and six private rooms. Physician care is provided on a full-time basis. He has regular hours daily and is on call for emergencies. Registered nurses are on duty at all times.

The Health Service offers comprehensive care to all students with referral available when the services of a specialist are required.

CONTINUING EDUCATION AND EXTENSION

The Office of Continuing Education and Extension is responsible for two areas of University programming:

A. Continuing Education or Adult Education is a series of programs tailored to the needs of the Charlotte area, taught either on or off the UNCC campus. Such programs may be designed for the general public or for special interest groups, but are usually of short duration and limited scope. They, therefore, do not award academic credit but may award continuing education units (CEU's). The CEU is rapidly becoming a universal unit of measure for non-academic involvement in educational programs, and records of CEU's are kept permanently. One CEU is awarded for every 10 hours of structured educational activity. Teachers of continuing education programs are contracted from the UNCC faculty and the community at large. Requests for programs or application to conduct a continuing education project should be submitted to the Office of Continuing Education and Summer Programs.

B. Extension is defined as programs for academic credit, offered off or extended from the UNCC campus. Extension work is limited to the academic areas approved for credit by The University of North Carolina Board of Governors and to courses approved by the UNCC faculty. Faculty teaching in extension must be approved by the academic department which awards the credit. Extension credit may be applied toward a degree at UNCC, but is limited by the residency required in each degree program.

EVENING COURSES

The University offers a well-rounded evening program consistent with its daytime classes. A substantial majority of the courses approved for graduate credit are available in the evening. Classes are held from 5 p.m. through 10:30 p.m. Information may be obtained from the Office of Academic Affairs. The phone number is 597-2225.

SUMMER PROGRAMS

Summer sessions are held each year, beginning in May and running until mid-August. Two terms of six weeks each are supplemented by short-term courses, institutes and workshops. Several longer-termed courses are also offered. Continuing students, visitors, or students from the community should find their needs answered by offerings from many disciplines and for many schedules. Information may be obtained from the Office of Academic Affairs. The phone number is 597-2225.

APPLICATION DATES

Due to the large number of applications the University is receiving and due to the rapid growth of this campus, the University may be required to announce an earlier cutoff date for applications. Unless such an announcement is made, applications may be submitted and completed according to the following schedule:

Term of Entry	*Application Must Be Filed By*	*Application Must Be Completed By*
First Summer Term, 1980	May 1	May 15
Second Summer Term, 1980	June 15	July 1
Fall Semester, 1980	July 1	July 15
Spring Semester, 1981	December 1	December 15
First Summer Term, 1981	May 1	May 15
Second Summer Term, 1981	June 15	July 1

The University may alter these application dates in accordance with available resources and the enrollment limitation established by the North Carolina General Assembly.

ACADEMIC CALENDAR

First Summer Session, 1980

May 26	Mon.	Residence halls open; registration
May 27	Tues.	Classes begin
May 28	Wed.	Last day to register or add a course for credit
May 30	Fri.	Last day to withdraw from school or drop a course with refund
June 10	Tues.	Last day to drop a course without grade evaluation; last day for engineering students to drop a course
June 27	Fri.	Last day to drop a course
July 1	Tues.	Last day of classes
July 2-3	Wed.-Thurs.	Final examinations

Second Summer Session, 1980

July 7	Mon.	Registration
July 8	Tues.	Classes begin
July 9	Wed.	Last day to register or add a course for credit
July 11	Fri.	Last day to withdraw from school or drop a course with refund
July 21	Mon.	Last day to drop a course without grade evaluation; last day for engineering students to drop a course
Aug. 7	Thurs.	Last day to drop a course
Aug. 11	Mon.	Last day of classes
Aug. 12-Aug. 13	Tues.-Wed.	Final examinations

Short Session, 1980

June 16	Mon.	Registration
June 17	Tues.	Classes begin
June 18	Wed.	Last day to withdraw from school or drop a course with refund

June 20	Fri.	Last day to drop a course without grade evaluation. Last day for engineering students to drop a course
June 21	Sat.	Classes meet
July 1	Tues.	Last day to drop a course
July 3	Thurs.	Last day of classes and/or final examinations

Eight-Week Session, 1980

June 16	Mon.	Registration
June 17	Tues.	Classes Begin
June 18	Wed.	Last day to register or add a course for credit
June 20	Fri.	Last day to withdraw from school or drop a course with refund
July 3	Thurs.	Last day to drop a course without grade evaluation. Last day for engineering students to drop a course
July 4	Fri.	No classes
Aug. 6	Wed.	Last day to drop a course
Aug. 11	Mon.	Last day of classes
Aug. 12-13	Tues.-Wed.	Final examinations

Fall Semester, 1980

Aug. 24	Sun.	Residence halls open; orientation begins
Aug. 25	Mon.	Faculty and staff convocation
Aug. 25-26	Mon.-Tues.	Orientation, registration and advising
Aug. 26	Tues.	Last day to register without a late penalty of $10
Aug. 27	Wed.	Classes begin, meet on Monday schedule
Sept. 1	Mon.	Labor Day (no classes)
Sept. 3	Wed.	Last day to register or add a course for credit
Sept. 10	Wed.	Last day to withdraw (or drop a course) with refund
Oct. 1	Wed.	Last day to file for a December degree

Oct. 13-14	Mon.-Tues.	No Classes
Oct. 20	Mon.	Reports of unsatisfactory grades by faculty
Oct. 31	Fri.	Last day to drop a course
Nov. 3-7	Mon.-Fri.	Early registration for spring semester, 1981
Nov. 26-28	Wed.-Fri.	Thanksgiving Holidays
Dec. 1	Mon.	Last day to file for a May degree
Dec. 12	Fri.	Last day of classes
Dec. 15	Mon.	Final examinations begin
Dec. 19	Fri.	Final examinations end
Dec. 22	Mon.	All final grades for fall semester due in Registrar's Office

Spring Semester, 1981

Jan. 11	Sun.	Residence halls open
Jan. 12-13	Mon.-Tues.	Orientation, advising and registration
Jan. 13	Tues.	Last day to register without a late penalty of $10
Jan. 14	Wed.	Classes begin
Jan. 20	Tues.	Last day to register or add a course for credit
Jan. 27	Tues.	Last day to withdraw (or drop a course) with refund
March 6	Fri.	Report of unsatisfactory grades by faculty
March 9-13	Mon.-Fri.	Spring holidays
March 20	Fri.	Last day to drop a course
April 13-17	Mon.-Fri.	Early registration for fall semester, 1981
May 1	Fri.	Last day of classes; last day to file for an August degree
May 4	Mon.	Final examinations begin
May 11	Mon.	Final examinations end
May 12	Tues.	All final grades for spring semester due in Registrar's Office
May 16	Sat.	Commencement Exercises

ADMISSIONS

ELIGIBILITY TO REGISTER

Registration in courses offered at the University of North Carolina at Charlotte is limited to those students who have been properly admitted on the basis of an application filed on or before the appropriate application deadline.

Persons seeking application forms and information about graduate study should address inquiries to the Graduate Studies Office, University of North Carolina at Charlotte, UNCC Station, Charlotte, North Carolina 28223.

Applications may be made for the regular semesters beginning in August and January and for the summer terms beginning in June and July. Applications for any term should be fully completed by announced deadlines and in no case later than one month before the opening of the term, to allow sufficient time for acquisition and processing of information required for admission.

The University considers all applications without regard to race, color or sex. The University reserves the right to withhold the admission of any applicant who fails to meet the general requirements for admission or the specific requirements listed for graduates.

GENERAL REQUIREMENTS FOR ADMISSION TO GRADUATE STUDY AT THE UNIVERSITY OF NORTH CAROLINA AT CHARLOTTE

A. Application in writing to the Graduate Studies Office, University of North Carolina at Charlotte.

B. Possession of a bachelor's degree, or its equivalent, from an accredited college or university.

C. Submission of two official transcripts of all previous academic work attempted beyond the high school sent directly from each institution attended.

D. Submission of satisfactory scores on the Graduate Management Admissions Test are pre-requisite to admission to the graduate program administered by the College of Business Administration (the MBA).

All other colleges and departments will accept scores on the Aptitude Portion of the Graduate Record Examination. The Department of Mathematics requires GRE Aptitude scores for admission to its MA degree program. The Department of Biology requires both the Aptitude and Advanced scores (Advanced score not required prior to admission or initial enrollment, but must be submitted before the end of first semester in residence), of applicants seeking admission to the program leading to the Master of Science in Biology. The Department of History requires both the Aptitude and History portions of the Graduate Record Examination for admission to its M.A. degree program.

The Departments of Geography and Mathematics and the College of Engineering will permit substitution of satisfactory scores on the Miller Analogies Test and the Doppelt Test of Mathematical Reasoning for the Aptitude

Portion of the GRE in the case of applicants seeking admission to programs leading to the Master of Arts in Geography or Master of Arts in Education in Mathematics.

Applicants for the remaining programs (MA in English, MHDL, MS in Chemistry, and MUA) may offer either the Aptitude Portion of the GRE or the Miller Analogies Test as part of their entrance credentials.

E. In general, an overall quality point average of 2.50 (based on the four-point system) on all the applicant's previous work beyond the high school. The average of the major or basic courses prerequisite to the area of proposed graduate study should be 3.0 or better.

F. At least three evaluations from persons familiar with the applicant's personal and professional qualifications.

G. An essay describing applicant's experience and objective in undertaking graduate study.

H. Such other evidence of achievement as may be required by the colleges or departments of major interest.

I. Students who meet the foregoing requirements but do not wish to enroll in a specific degree program may be admitted to full standing as unclassified students.

J. Certain other applicants who satisfy prerequisities for specific courses may be admitted to those courses as non-degree students though they may not meet all the foregoing requirements. Students admitted as non-degree students who later wish to qualify for full standing must reapply for the new classification.

A person will be considered for admission to a degree program only after the application and all its supporting credentials have been filed with the Graduate Studies Office. Any supporting credentials that are submitted without an application will be maintained on file in the Graduate Studies Office for one year; and the applications and supporting credentials will be maintained on file for two years for individuals who are admitted to degree programs but who do not enroll in the term for which their admission was processed. The applications and supporting credentials for individuals who are not found admissible to degree programs will be maintained on file for one year. Persons who do not submit their materials in time to be considered for admission in the term which they have requested, are expected to notify the Graduate Studies Office if they wish to be considered for admission to any subsequent term.

ADDITIONAL ADMISSIONS REQUIREMENTS FOR FOREIGN APPLICANTS

A. Submission of *Official Scores* on the Test of English as a Foreign Language.

B. An Affidavit of Support, Form I-134, must be filled out showing the applicant's financial resources during his/her stay in the United States.

C. *A Summary of Your Educational Experiences by Years* must be filled out in addition to the application.

D. Under no circumstances will an I-20 form be issued until the applicant has been admitted to a degree program.

All applicants submitting transcripts from non-U.S. educational institutions should note that some bachelor's degrees given by non-U.S. schools are not equivalent to the American bachelor's degree. Recipients of these degrees are not eligible for graduate study at the University of North Carolina at Charlotte.

GENERAL CLASSIFICATION

Admission to one of these categories does not imply and should not be confused with later admission to candidacy for a graduate degree.

Full Standing

Applicants who meet the general requirements for admission to graduate study plus any specific requirements imposed by the college or department of academic concentration for the degree sought will be admitted to full standing.

Conditional Standing

Conditional admission to full standing may be granted to students who have:
a. general or special deficiencies which require remedial work;
b. degrees awarded as long as six years prior to admission; or
c. a less clearly predicted chance of success according to available criteria.

Each student granted a conditional admission will be responsible for contacting his/her adviser when he/she has successfully satisfied the conditions for admission. The adviser will then be responsible for contacting the Graduate Office, in writing, concerning any change in the student's admission status.

Admission of Unclassified Students

Any applicant wishing to take more than nine semester hours of graduate course work and who does not intend to seek a Master's degree may be admitted to full standing as an unclassified student. A completed application form, together with all supporting data, should be filed in the Graduate Office prior to the application deadline date for the term in which the applicant wishes to enroll. If such applicant meets the general criteria for admission, he/she may then be admitted to full standing as an "unclassified" student.

Non-Degree Status

Certain students who wish to take courses for certificate renewal, for transfer to another institution or for personal satisfaction may be admitted as Non-Degree students. This admission is for *one term only.*

A non-degree student who is subsequently admitted to full or conditional standing on the basis of an approved regular application may, with the permission of his/her adviser, apply a maximum of two courses acceptably completed in non-degree status toward a graduate degree at the University.

The applicant who plans to take nine or more semester hours of graduate course work should apply as an "unclassified" student even though he/she does not intend to seek a graduate degree.

Interrupted Enrollment

Any student eligible to continue whose course of study is interrupted for one or more academic terms must apply for readmission and should do so on a form furnished by the Graduate Office at least six weeks prior to the desired term of re-entry.

Non-Matriculation

An applicant admitted to a degree program who fails to enroll for the term to which admitted is presumed to have withdrawn his/her application. The application may be reinstated if the request to do so is received within two years from the originally requested term of entry. This request should be in writing and addressed to the director of graduate studies at least six weeks prior to the term in which the applicant desires to register.

CRITERIA FOR CONTINUED ENROLLMENT

A student in any graduate program is required to maintain satisfactory progress toward the degree. Continued enrollment is at all times subject to review on the basis of academic record and of actions with regard to observance of University rules and regulations.

Students admitted to *full standing* will normally be permitted to re-enroll in successive terms, subject to satisfactory performance on course work and to load limitations imposed by their regular employers and the University. However, they must complete formal registration within the designated registration period. A student admitted conditionally to full standing will be permitted to continue, subject to satisfactory academic performance, until he/she has attempted 12 semester hours of graduate course work or satisfied other conditions of admission as may have been imposed by the student's major department, at which time admission status will be reviewed by the major department and the student will be advised as to his/her eligibility to continue.

Students admitted to *non-degree* status are admitted for one semester only and should fulfill requirements for admission to full standing by the application date for the following term if they wish to take additional course work.

READMISSION

Students in degree programs who are in good standing and whose enrollment is interrupted for one or more academic terms should apply for readmission at least six weeks prior to the beginning of the term in which they plan to re-enroll, on a form furnished by the Graduate Office. Such applications will normally be granted without question.

Students whose enrollment is terminated for academic reasons may request readmission under the following procedures: The student will be notified of the termination of his/her enrollment in the graduate program by the Director of Graduate Studies. The student will be expected to initiate the reapplication procedure by applying for readmission through his/her major department. Such application must be accompanied by a $10 application fee, which is not refundable. The department will designate a Readmission Committee to consider the student's appeal for readmission. The committee will be composed of faculty members other than the faculty member(s) who assigned the grades of *C* or *U*. The Readmission Committee shall recommend to the Director of Graduate Studies that the student either be reinstated or dropped from the program. The Readmission Committee will decide each case on its individual merits.

ADMISSION OF TRANSIENT STUDENTS

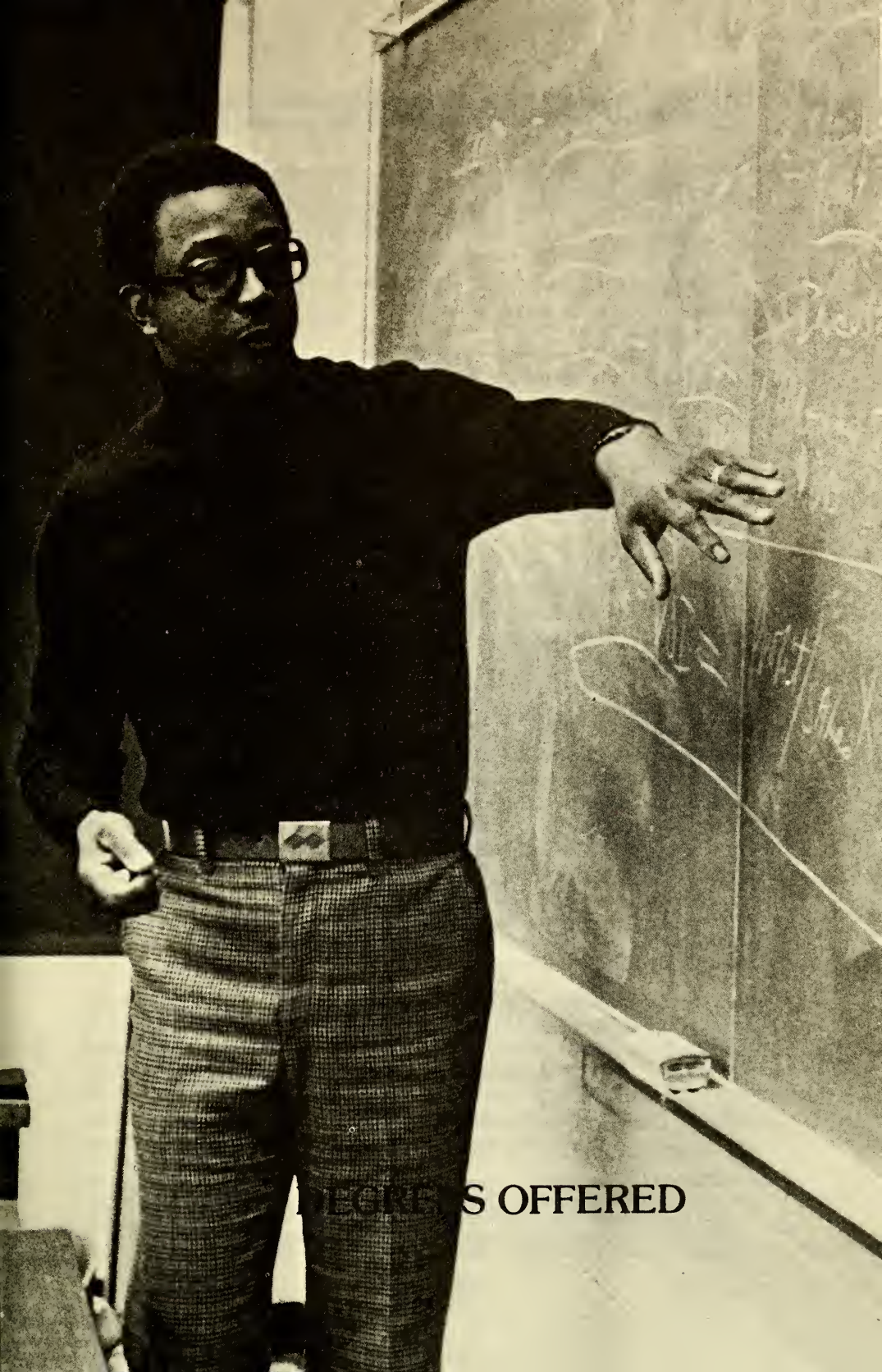
Students enrolled at other colleges and universities who have the written permission from their institutions to take specified courses at the University in a given semester or summer term may be enrolled as transient non-degree students.

ADMISSION OF AUDITORS

Any student eligible for admission may register for any class for audit. The application procedure and fees are the same as for classes taken for University credit.

The participation of auditors in class discussion and in tests or examinations is optional with the instructor. Auditors receive no University credit. They are, however, expected to attend class regularly. Notation of an audited class on the student's permanent record is made, but no grades will be given.

Adding or dropping an audit course is governed by the same procedures as adding or dropping a course for credit.



DEGREES OFFERED

The University of North Carolina at Charlotte offers the following graduate degrees:

College of Arts and Sciences
Master of Arts (M.A.)
English
Geography
History
Mathematics
Master of Arts in Education (M.A.Ed.)
Mathematics
Master of Science (M.S.)
Biology
Chemistry
Master of Urban Administration (M.U.A.)
Political Science

College of Business Administration
Master of Business Administration (M.B.A.)

College of Engineering
Master of Science (M.S.)
Engineering

College of Human Development and Learning
Master of Human Development and Learning (M.H.D.L.)

NEW DEGREE PROGRAMS PLANNED

As of spring semester 1978, the University of North Carolina at Charlotte with the approval of the Board of Governors is engaged in planning master's degree programs in the fields of: Special Education, Music, (performing, composition, theory), Nursing, Psychology (general), Law Enforcement and Correction, and Metropolitan and Environmental Planning. The public will be advised through communications media when programs in any of these areas are complete and approved for implementation. In the meantime the University Graduate Office will welcome inquiry about the status of any particular program.*

MASTER OF ARTS IN ENGLISH

The Master of Arts in English degree program is designed to accommodate students seeking a Master of Arts degree with or without graduate certification in teaching. The program is flexible enough that it can serve the particular needs of the individual student, whether used for general education and enhanced knowledge and understanding, for personal pleasure, for professional advancement or for further preparation for teaching at the primary, secondary or two-year or four-year college level. The student may pursue a broad spectrum of literature, writing

**In addition to these, UNCC has submitted to the General Administration of the University of North Carolina proposals to offer the M.A. in Psychology, the M.H.D.L. in Special Education, Certificates of Advanced Study in Secondary Education, Early Childhood and Intermediate Education, Counseling and Guidance, Educational Administration, and Curriculum and Instruction; the M.S. in Nursing; and the M.S. in Criminal Justice.*

and language; or the student may concentrate in a particular field or area, such as linguistics, writing, American literature, British literature, modern literature, etc.

Special Admission Requirements

1. Thirty hours of undergraduate course work in English beyond the freshman level approved by the Department of English.
2. A satisfactory score on the Aptitude Portion of the Graduate Record Examination or on the Miller Analogies Test.

Approval of Individual Program

Approval of the program of each student and advice regarding progress toward the degree will be the responsibility of an adviser appointed by the Department of English at the time of the student's admission.

Course Requirements

1. The program requires a minimum of 30 semester hours of acceptable graduate credit, 15 of which must be for English courses open only to graduate students. Of the 30 hours of graduate credit, 27 hours (six of which may be applied to a thesis if that option is taken) must be for English courses. Three hours of electives may be taken either in English or in related work on the graduate level (e.g., in History, Human Development and Learning, etc.). No more than six hours of English 690 (Directed Reading) may be applied to the degree without written permission of the Chairman of the Department. [Those students who already have an "A" teacher's certificate and who wish to obtain a "G" certificate at the completion of the degree must have six hours of graduate credit in Human Development and Learning, three hours of which can be part of the minimum 30 hours for the M. A. in English (for a total of 33 hours). Graduate courses in English can be applied toward subject matter requirements for an "A" certificate, but courses so used can not also be applied toward subject matter requirements for a "G" certificate.]

2. The English courses offered for the degree must include the following:
   a) at least three hours in language, linguistics, rhetoric or writing
   b) at least three hours in American literature
   c) at least three hours in British literature before 1800
   d) at least three hours in British literature after 1800 (English 625 may be used for this).

3. While a thesis is not required for the degree, those students wishing to write one may do so (see the course description for English 696.)

4. Courses beyond 30 semester hours of graduate credit may be required to remove deficiencies or to satisfy requirements for graduate certification, or may be recommended to develop areas of need, to pursue particular interests, or to gain needed experience.

5. Up to six semester hours of appropriate graduate credit may be accepted for transfer from another accredited institution.

Examination

Each student must pass a comprehensive examination (including both written and oral segments) on all the work presented for the degree. This may not be attempted sooner than three weeks after all English courses for the degree are completed.

MASTER OF ARTS IN GEOGRAPHY

The M.A. in Geography offers concentration in three areas of study: (1) Location Analysis; (2) Urban-Regional Analysis and Planning; and (3) Environmental Analysis. The Location Analysis concentration focuses primarily upon a study of the location of commercial and public facilities. Students interested in retail location, industrial development, market area analysis, and transportation should pursue coursework in this concentration. Those students interested in planning or a broader perspective of the urban and regional environment should take coursework in the Urban-Regional Analysis and Planning concentration. The Environmental Analysis concentration is aimed toward the training of the student in the identification and solution of problems of the physical environment which have important consequences for our society.

Admission

The M.A. in Geography is open to all who can fulfill the general requirements for admission to graduate study at the University of North Carolina at Charlotte, as stated in the *Graduate Catalog.* In addition, the following criteria are applied by the Departmental Graduate Advisory Committee in reviewing applications.

(1) an overall quality point average of 2.8 (4.0 system) on the last 60 semester hours (90 quarter hours) attempted;

(2) a quality point average of 3.0 in the undergraduate major, whatever it may be;

(3) a satisfactory total score on the aptitude portion of the Graduate Record Examination or satisfactory scores on both the Miller's Analogy Test and the Doppelt Test of Mathematical Reasoning.

(4) applicants whose native language is other than English must offer acceptable scores on the Test of English as a Foreign Language.

In the absence of extenuating circumstances, failure to meet these criteria will result in rejection of an application.

An undergraduate major in geography is not required. In order to ensure competence in the basic concepts and methodologies of geography, however, the department expects each incoming student to either possess or establish a proficiency with materials offered in several undergraduate courses. For students in the Location Analysis and the Urban-Regional Analysis and Planning concentrations, these courses are GGY 105 (Human Location), GGY 202 (Cartography), and GGY 203 (Research Methods). The relevant courses for the Environmental Analysis concentration are ES 101 (Earth Science-Geography), ES 102 (Earth Science-

Geology), GGY 202 (Cartography, and GGY 203 (Research Methods). Deficiencies may be removed after admission by either taking the appropriate course or through examination.

Students may enter during any semester, but applications for full admission normally must be completed by the published deadline. All applications for admission that satisfy general University admission requirements will be reviewed by a Departmental Graduate Advisory Committee for a final decision. Upon admission each student will be assigned to an adviser who will work with the student in designing a program of study. All potential applicants are encouraged to visit the department for an interview.

Course Requirements

The M.A. in Geography requires a minimum of 36 semester hours of graduate credit. GGY 615, 617, 618 and 690-691 will be required of all students. Up to 12 hours may be taken in related work.

Required Courses	
GGY 615	3 semester hours
GGY 617	3 semester hours
GGY 618	3 semester hours
GGY 690-691	6 semester hours

Elective Courses	
Other 600 level courses in geography and earth sciences	9 (minimum)
Other courses in geography and/or related subjects	12 (maximum)
Total	36 semester hours

Internships

Most students will work as interns in a public or private agency. This work will take place toward the end of a student's program. The departmental internship director will assist students and faculty advisers in placing the student in an internship position that best relates to the interests of the student. The purpose of the internship is to expose the student to the problems and activities of the community and for the student to have the opportunity to apply geographic theory, technique and knowledge to real life practices. The student intern will work on a specific project under the supervision of both the sponsor and a faculty adviser. The results of the internship project will form the basis for the Individual Research Project report. The internship is not required and will be arranged only when it is possible to find a sponsoring company or agency that is willing to support research in the area of the student's interest. If a suitable internship cannot be arranged, the student will be expected to execute an independent research project at the level of a thesis in order to satisfy the 690-691 course requirement.

Transfer Credit

Six semester hours of course work may be accepted for transfer from other accredited instituions. Course credit may be earned by examination as well. Transfer credits will not be accepted automatically. In any case, transfer credits, re-

lated work or credits earned through examination may not together exceed a total of 12 of the minimum 36 hours required.

Continued Enrollment

The progress of each student will be reviewed every semester by the departmental Graduate Advisory Committee and by the student's adviser. Continued enrollment will require a favorable recommendation by the Committee and the adviser. Prompt removal of any entrance deficiencies will be a major criterion for continued enrollment.

Time Limits

All work offered for the M.A. degree must be completed within a six-year period.

Final Examination

Each student must pass a comprehensive examination over both the discipline generally and in defense of the individual research report, as appropriate. The examination may be both written and oral.

Admission to Candidacy and Application for Degree

General academic regulations apply for admission to candidacy for the degree and the application for degree.

MASTER OF ARTS IN HISTORY

The Master of Arts in History degree program is designed to assist individuals in developing the methodological, literary and conceptual skills of the professional historian. Graduates of the program will be able to employ this expertise in a variety of ways, as students in a doctoral program, as professionally oriented history teachers in the secondary schools or as citizens more acutely aware of the historical development of their society.

The Department of History offers graduate programs with concentration in European or United States history. Students may also select graduate courses in African, Asian and Latin American history.

Admission

Applicants must fulfill the general requirements for admission to graduate study at UNCC. All applications for admission must be approved by the Graduate Committee of the Department of History. Although an undergraduate major in history is not required, applicants must submit credentials promising a successful completion of the program. Substantial preparation in history or related fields, i.e., political science, Foreign languages, English, will weigh heavily with the Graduate Committee. Applicants will also be required to submit with their application scores on the Aptitude and History portions of the Graduate Record Examination. Finally, the Graduate Committee reserves the right to admit with specific conditions, or to establish prerequisites for admission, in cases involving students submitting marginal credentials.

Degree Requirements

The Master of Arts in History requires the completion of 30 hours of graduate work with a *B* average in all courses taken for graduate credit and with a maximum of two *C*s permitted for continuation in the program.

Candidates must complete a minimum of 24 hours of work in history courses approved for graduate credit. Of the 24 hours, no more than six may be taken in individually designed readings courses. At least nine of the 24 hours must be taken in seminars, or colloquia, open only to graduate students. All students must complete HIS 693: Historiography and Methodology with a grade of *B* or better.

Students may elect six hours of graduate work in another field. Candidates seeking Graduate Education Certification may exercise their elective option by undertaking graduate course work in the College of Human Development and Learning. Students seeking Graduate Education Certification should solicit the advice of the College of Human Development and Learning as to appropriate professional education courses. Should the College of Human Development and Learning require more than six hours for Graduate Education Certification, the additional hours will be added to the total ordinarily completed for the Master of Arts in History.

Candidates must successfully complete a comprehensive written examination in their area of concentration. This examination will be given at or near the completion of course work.

Candidates must successfully complete a final oral examination, which will include a defense of a formal thesis or a seminar paper selected by the student as illustrative of the student's historical research and writing.

Students are not required to demonstrate through examination knowledge of a foreign language, however, the Department of History assumes that a candidate will be able to use whatever languages are required by the candidate's research interests.

Administration

The admission of students and approval of each student's program shall be the responsibility of the Graduate Committee of the Department of History.

The planning and monitoring of each student's program shall be the function of the Graduate Coordinator. The Graduate Coordinator shall advise and assist the student in selecting an Examining Committee.

The Examining Committee shall conduct the student's comprehensive written and final oral examinations. The Examining Committee shall consist of two faculty members from the Department of History, and a third member selected from History or another department.

Continued Enrollment

All students in the program are expected to maintain a *B* average in all courses taken. Students whose average falls below that level will be subject to suspension on recommendation of the Graduate Committee of the Department of History.

Residence Requirements

At least 24 hours of graduate work must be taken in residence. No more than 12 hours credit, six of which may count toward residence, may be accepted for transfer from other campuses of the University of North Carolina. A maximum of six hours may be accepted from other accredited universities.

Time Limit

All requirements for the Master of Arts in History degree must be completed within six calendar years of the date of original enrollment in the program.

MASTER OF ARTS IN MATHEMATICS

The Master of Arts in Mathematics is designed to provide advanced skills and knowledge for those seeking positions in industry or in government, or teaching positions at the junior college or community college level, and to provide professional development to those currently in such positions. Graduates of the program will also be well trained to enter directly into at least the second year of a Ph.D. program in mathematics at other institutions.

Admission

For admission into the program leading to the Master of Arts in Mathematics an applicant must fulfill the general requirements for admission to graduate study at the University of North Carolina at Charlotte. In addition, he must present evidence of the satisfactory completion of at least 27 semester hours of mathematics, approved by the Departmental Graduate Committee and submit satisfactory scores on the Aptitude Portion of the Graduate Record Examination. It is recommended that the student have a basic knowledge of at least two of the areas of algebra, real analysis, and topology.

Degree Requirements

The Master of Arts in Mathematics requires successful completion of a minimum of 30 semester hours of graduate work approved by the department. At least 15 hours applied to the degree must be in mathematics courses at the 700 level; at least one of these courses must be in real or complex analysis and at least one selected from the areas of linear algebra, modern algebra or topology. The candidate must demonstrate competence on general mathematical knowledge in at least three of the following areas; algebra, applied mathematics, real analysis and topology. This may be accomplished by means of either a) successful performance on a written comprehensive examination, or b) successful completion of courses in these areas. In addition, all candidates must perform satisfactorily on an oral comprehensive examination over the candidate's program of graduate study.

Completion of a satisfactory thesis is optional. With the approval of the Departmental Graduate Committee, a candidate may receive at most six of the 15 hours required at the 700 level for the writing of a master's thesis. Subject to the approval by the Departmental Graduate Committee, this thesis may be either original work, work of an expository nature, or the mathematical formulation and solution of a particular industrial or business problem suggested by the career interests of the student. If the thesis option is elected, the candidate will be required to defend his/her thesis in an oral examination.

Program Approval

Approval of the program of each student and the monitoring of his/her progress toward the degree will be the function of the Departmental Graduate Committee. The student should refer to the "Academic Regulations" in the present catalog for a description of his/her own responsibilities.

Continued Enrollment

A student in the M.A. Mathematics program is required to maintain satisfactory progress toward the degree. Continued enrollment is at all times subject to review on the basis of his/her academic record; this review to be performed by the Departmental Graduate Committee.

Commendable (*A*) or satisfactory (*B*) grades are expected of all students in the program. An accumulation of three marginal (*C*) grades or one unsatisfactory (*U*) grade result in the termination of the student's enrollment in the program. In order to continue his/her program of study the student is required to apply for readmission into the program. If the decision on the reapplication is positive the student is expected to complete his/her program with satisfactory or commendable performance in all remaining work. Another marginal grade (*C*) or unsatisfactory grade (*U*) will result in permanent termination of enrollment in the program.

Residence Requirements

The general University of North Carolina requirements for residence apply. See the sections on "Transfer Credits" and "Residence Credits" under "Academic Regulations."

Transfer Credit and Credit by Examination

With the approval of the Departmental Graduate Committee, a candidate may receive transfer credit or credit by examination in accordance with the policies set forth in the section on "Academic Regulations."

Admission to Candidacy

General academic regulations apply for admission to candidacy.

MASTER OF ARTS IN EDUCATION (MATHEMATICS)

The Master of Arts in Education (Mathematics) degree program is designed primarily for secondary school teachers interested in professional growth and graduate certification in mathematics. This program of studies is coordinated as an

interdisciplinary program between the Department of Mathematics and the College of Human Development and Learning. Emphasis in this program is given to developing depth and breadth in mathematics appropriate to the role of the teacher. The requirements of the program of studies include a major of 18 semester hours of graduate credit in mathematics, six semester hours of graduate credit in Human Development and Learning and six semester hours of electives in mathematics, Human Development and Learning or a third department. It is strongly recommended that candidates completing only six semester hours of credit in Human Development and Learning select HDL 600 and HDL 620.

For this degree program, the adviser shall be assigned from the Department of Mathematics.

Admission Requirements

Each applicant must show evidence of demonstrated or potential capacity to profit from graduate study in mathematics and in professional education. He must fulfill the following requirements:

1. Eighteen hours of approved undergraduate work in mathematics.

2. Evidence of satisfactory scope and quality average in undergraduate courses in professional education.

3. Possession of a North Carolina Class "A" teacher's certificate or the equivalent. An applicant may be admitted on the condition that he satisfy the Class "A" requirements early in his course of study. Work applied to correct the Class "A" deficiency may not be applied toward the M.A.Ed. degree.

4. Up to six hours of graduate credit may be accepted for transfer from another accredited institution.

5. The submission of an essay on the student's professional goals and interests, together with the formal application.

6. Satisfactory scores on the Aptitude Portion of the Graduate Record Examination or the Miller Analogies Test and the Doppelt Mathematical Reasoning Test.

Requirements for the Degree

Course Requirements

After the admission to graduate study at the University of North Carolina at Charlotte, the candidate must successfully complete a minimum of 30 semester hours of work in courses approved for graduate credit. Of these, at least 15 hours must be taken from courses open to graduate students only. Courses will be distributed as follows:

1. *Mathematics* ..... 18 semester hours

   Successful completion of six three-hour graduate courses or the equivalent. At least three of these must be in courses open only to graduate students.

2. *Professional Education* ..... 6 semester hours

   Successful completion of at least two three-hour graduate courses or the equivalent as approved by the College of Human Development and Learning. HDL 600 and HDL 620 are recommended.

3. *Electives* ..... 6 semester hours

   Successful completion of at least two three-hour graduate courses or the equivalent. One or both of these may be in areas of mathematics, professional education or a related area approved by the student's adviser.

Thirty semester hours of graduate credit or the equivalent are the minimum required for the degree and for graduate certification. Programs of study beyond the 30 semester hours of graduate credit may be required to remove deficiencies in undergraduate programs, to develop areas of need, interests or needed experience. The student's adviser may recommend additional credits beyond the 30 semester hours required, or equivalent experiences may be designed.

MASTER OF BUSINESS ADMINISTRATION

Admission

Admission to the Master of Business Administration program is open to qualified graduates of recognized colleges or universities accredited by a regional or general accrediting agency.

There are four major requirements for admission.

1. A generally satisfactory undergraduate record.
2. An acceptable score on the Graduate Management Admissions Test administered by the Educational Testing Service of Princeton, New Jersey.
3. A description of any significant work experience.
4. Three supporting letters of recommendation from professors or employers.

Applications should be completed *at least three months prior* to the semester in which the applicant expects to enroll.

Program Philosophy

The primary objective of graduate study in business is to develop candidates for leadership positions in complex organizations of the future. The basic philosophy of the graduate program recognizes that managerial procedures and practices of today are subject to rapid change. For this reason, the program emphasizes a process of perceiving, analyzing and solving administrative problems. The burden is placed on the student to determine relevant facts, evaluate alternatives and prepare for action. Organizations are analyzed as behavioral, financial and technological units operating in an environment with changing regional, national and international dimensions. Candidates are encouraged to anticipate, innovate and adjust to this dynamic environment.

The curriculum stresses the universal characteristics of management and their application in various types of organizations. Fundamental problems are examined from an economic, information systems and behavioral point of view.

Courses in economic analysis and managerial accounting focus on financial performance and resource allocation, while those in administrative practices emphasize individual and group conduct. Courses in information analysis make possible the integration of the economic and behavioral aspects of administrative problems with the decision-making requirements of practicing managers. These areas along with courses in the functional areas of business, marketing, production and finance, and a course in legal environment constitute the core courses in basic analysis required of all candidates.

After completing the basic analysis sequence, a student selects two (2) additional courses from among the graduate courses offered by the College of Business Administration. This provides an opportunity for students to choose courses of particular interest to them.

The final courses in the program deal with management policy and strategic planning. These courses are designed to integrate the knowledge and skills of analysis developed in the preceding courses of the MBA program and to assure that the student can demonstrate application in a comprehensive manner through a study of cases, current information on company and industry applications, and through a major written project.

The methods of instruction adopted in the program are designed to prepare a candidate for the realities of a management career. These methods include simulations, role playing, written communications, lectures and the case study method. It is the ability to analyze, to judge trends, to weigh diverse influences that lead to sound judgment. This capability can be developed only through practice. The methods of instruction employed in the program are designed to provide such practice.

Courses in the program are scheduled to accommodate part-time students. Classes are held in the evening throughout the year. Part-time students may enroll in two courses during the fall and spring semesters. A part-time student may complete the program in three years. Full-time students may enroll in four courses during the fall and spring semesters and may complete the program in two years, depending upon scheduling of courses.

Program Design

A. Preparation

Candidates for the Master of Business Administration must present evidence of preparation in accounting, calculus and statistics, economics and computer science before beginning the graduate course work.

B. Basic Analysis

All candidates are required to take the following basic core courses (27 hours):

Mgt. 611 Economic Analysis I
Mgt. 612 Economic Analysis II
Mgt. 622 Quantitative Analysis for Business
Mgt. 631 Managerial Accounting
Mgt. 641 Production Management
Mgt. 652 Financial Management
Mgt. 661 Administrative Practices I
Mgt. 671 Marketing and Logistics
Mgt. 681 Legal Environment

C. Elective Courses

After completing the basic analysis sequence, candidates must select two additional courses (six hours) from among the following courses:

Mgt. 651 Financial Markets
Mgt. 621 Information Systems
Mgt. 653 Investment Management
Mgt. 662 Administrative Practice II
Mgt. 672 Marketing Research and Forecasting
Mgt. 673 Marketing Communication and Promotion
Mgt. 690 Directed Individual Study
Mgt. 692 Business and Society

D. Capstone Courses

The final courses required of all candidates are:

Mgt. 694 Management Strategy
Mgt. 696 Strategic Planning

MASTER OF HUMAN DEVELOPMENT AND LEARNING

The Master of Human Development and Learning degree is designed, both from the point of view of sound graduate professional study and professional certification, around a body of knowledge and experiences common to several types of professional needs and interests. Graduate courses, seminars and clinical experiences comprising the major may be conceptualized as an evolving continuous spiral, giving emphasis to the four phases: I. Explorations in Human Potential; II. Meaning and Growth in Teaching/Learning Relationships; III. The Helping Relationships and IV. Experience and Commitment in Human Development and Learning.

Each program of study requires involvement in the development of understandings and competencies in each of the phases. A concentration of studies in one phase is designed to develop areas of major interests, needs and certification. The program of studies should proceed from Phase I through Phase IV. Therefore, the student should begin a program of studies by enrolling in HDL 600. Phases I and II are sequential and may be integrated but are prerequisite to the Human Development and Learning component of Phases III and IV. Phases III and IV are integrative.

Special Admission Requirements

Students desiring to enroll in this program must meet the following special requirements:

1. Evidence of satisfactory scope and quality point average in courses in human development and/or professional education and a satisfactory scope and quality point average in courses appropriate to the cognate concentration.

2. Possession of a North Carolina Class "A" teacher's certificate or the equivalent. Applicants may be admitted on the condition that they satisfy the Class "A" requirements. Work applied to correct the Class "A" deficiency may not be applied toward the M.H.D.L. degree.

3. The submission of an essay on the student's professional goals and interests together with the formal application.

4. Satisfactory scores on the Aptitude Portion of the Graduate Record Examination or the Miller Analogies Test.

Requirements for the Degree

The candidate for the degree of Master of Human Development and Learning must successfully complete a minimum of 36 semester hours of work in courses approved for graduate credit. Of these, at least 18 must be in courses which are open to graduate students only.

All majors in Human Development and Learning are expected to satisfactorily complete 18 semester hours in Human Development and Learning and 18 semester hours distributed among Human Development and Learning and/or related areas depending upon certification requirements and program interests. Up to six semester hours of graduate credit if appropriate to the student's program may be accepted for transfer from another accredited institution.

Thirty-six semester hours of graduate credit or the equivalent are the minimum required for the degree and for graduate certification. Programs of study beyond the 36 semester hours of graduate credit may be required to remove deficiencies in undergraduate programs, to develop areas of need, interests or needed experience. The student's adviser may recommend additional credits beyond the 36 semester hours required or equivalent experiences may be designed.

Students seeking graduate certification in Guidance and Counseling without the equivalent of the North Carolina "A" certification are required to complete at least six additional semester hours with at least three semester hours in a school internship or its equivalent.

Curricula

The major for this degree is Human Development and Learning. However, within the framework of its requirements, the North Carolina Department of Public Instruction has approved programs leading to graduate teacher certification in Early Childhood and Intermediate Education. Also approved are special service certificate programs in Counseling, School Administration and Supervision and,

within the area of Curriculum and Instruction, secondary subject fields and special concentrations. At present, these certifications are limited to the master's degree, or fifth year level.

Approval of Individual Program

Approval of the program of each student and advice regarding progress toward the degree will be the responsibility of an adviser, with consultation and advice of a graduate committee. The committee shall consist of the adviser and at least two other faculty members representing the major areas of concentration which are significant in the student's program.

Comprehensive Examination

A comprehensive examination of the candidate's program of studies is required. This examination will be designed to evaluate the candidate's ability to integrate the various components of each graduate program including courses, independent study and clinical experiences. The purpose of the examination is to provide the opportunity for the candidate to demonstrate his/her knowledge and related to his/her professional goal; to demonstate his/her ability to analyze an educational problem including diagnosis, synthesis and the ability to bring data and experience to bear upon the solution.

The examination will typically include a written and oral phase. The written phase requires the presentation of a project developed and executed during the last 18 hours of the individual's graduate program. Candidates should consult their advisers near the end of the first 12 hours of work about the planning of such projects. Date for the oral examination will be arranged with the Office of Graduate Studies. As a general policy, the final comprehensive examination for the Master of Human Development and Learning degree must be satisfactorily completed not later than the last day of classes of the term in which the student expects to graduate. Persons seeking Graduate certification are reminded that all requirements for the degree must be completed on or before the last day of the second summer session.

*MASTER OF SCIENCE IN BIOLOGY**

The Master of Science in Biology is designed to provide broad training in the areas of development, ecology, physiology, microbiology and genetics. This breadth of training could meet many needs. The program, however, encourages specialization in the form of mandatory thesis research and course participation in specialty or related areas such as biochemistry. Specialization may provide a basis for more advanced studies or enable the student to choose, in addition to teaching, technical and/or health-related areas of vocation. Graduates of this program are expected to have both breadth of knowledge in the major biological areas and depth of knowledge and technical experience in a selected field of specialization.

Admission

For admission into the program leading to the Master of Science in Biology an applicant must fulfill the general requirements for admission to graduate study at

*New procedures are pending final approval.

the University of North Carolina at Charlotte. In addition he/she must present evidence of the following.

1) Undergraduate preparation in biology substantially equivalent to that required for an undergraduate major in biology at the University.

2) Reading knowledge of a modern foreign language; a student without such competence must successfully complete this requirement prior to admission to candidacy.

3) Promise of being able to complete successfully the degree program as outlined below.

4) Although not required for admission or initial enrollment, each applicant is urged to take the Advanced Graduate Record Examination in biology.

Degree Requirements

The Master of Science in Biology requires successful completion of a minimum of 32 semester hours of course work approved by the department. Of these, at least 16 semester hours must be in courses open to graduate students only. Of the total, no more than eight hours may be credited for research. All courses offered for the degree must carry grades of "Satisfactory" or "Commendable" as defined in the current *Graduate Catalog.*

In addition to course work, each candidate for a degree must pass an oral comprehensive examination. Finally, the candidate must prepare and present a thesis acceptable to the supervisory committee and the Director of Graduate Studies at least three weeks before the date of the final oral examination.

The candidate must also successfully complete a final oral examination which will include a defense of the thesis.

Program Approval

The approval of each student's individual program and the monitoring of the progress toward the degree will be the function of a supervisory committee. The student should refer to the "Academic Regulations" in the present *Catalog* for a definition of the student's responsibilities.

Continued Enrollment

A student in the M.S. in Biology program is required to maintain satisfactory progress towards the degree. Continued enrollment is at all times subject to review by the supervisory committee and the Office of Graduate Studies.

Residence Requirements

A total of at least 26 semester hours of work offered for the degree must be taken in residence as defined in current academic regulations. At the discretion of the student's supervisory committee transfer credit may be accepted subject to the usual limitations.

Admission to Candidacy

General academic regulations will apply to application for admission to candidacy. In addition to these the applicant should:

1) Have removed any identified entrance deficiencies by the time of application.

2) Have successfully completed the candidacy examination.

MASTER OF SCIENCE IN CHEMISTRY

The program leading towards the degree of Master of Science in Chemistry is a research-based program, requiring courses of a broad, general nature. Major emphasis is placed upon the research project and required thesis.

Admission

All applicants must fulfill the general requirements for admission to graduate study at UNCC. Students judged by the department to be deficient in their training will be admitted conditionally. As an aid in identifying such deficiencies, placement examinations will be given by the department each semester just prior to registration. Any deficiencies will be removed within one year by remedial study as directed by the department.

Degree Requirements

The candidate for the degree must present a minimum of 30 semester hours of which at least 15 semester hours must be 600-level courses which are open to graduate students only. The remaining credit may be earned by taking courses approved for graduate credit. Required courses include CHE 411, 421, 431, 680 and 690. Two semester hours of graduate seminar, CHE 680, and at least one, but up to 16 semester hours of research and thesis credit, CHE 690, must be presented. In addition, six semester hours from the course group CHE 615, 625, 635, 645, 646 or 660 are required. Departmental approval is necessary before CHE 660 credit can be used to satisfy this requirement. Any 300 level or higher mathematics or physics course except those designed for a professional education sequence may be taken for graduate credit. Well prepared students, particularly those with degrees from ACS approved programs will normally achieve CHE 411, 421, and 431 through placement examinations administered after admission. In those cases, CHE 411, 421, and 431 hours may be replaced by research, CHE 690, or by elective courses. A quality point average of 3.0 (A=4.0) is required for the degree. In addition, the following specific requirements must be fulfilled:

1) Satisfactory performance on a reading examination in the chemical literature in Russian, German or French. This requirement will be waived with the presentation of passing grades for the first two college years (four semesters or their equivalent) of one of the three acceptable languages. As an alternative to the language requirement, the student may offer proficiency in computer language. Decisions as to the acceptability of the level of computer proficiency will be made by the Chemistry Department.

2) Acceptance of the thesis within five calendar years after admission into the M.S. program as a degree student. This includes a successful defense of the written thesis before a special thesis committee established by the Chemistry Department. The thesis committee shall consist of no fewer than four persons, at least one of whom must be from a department other than Chemistry.

Program Approval

Approval of the program of each student and monitoring his/her progress toward the degree shall be the responsibility of the student's research adviser. Prior to the selection of a research adviser, graduate student progress is monitored by the Departmental Graduate Committee. A student should refer to "Academic Regulations" for a discussion of his/her responsibilities.

Continued Enrollment

A student in the chemistry M.S. program is required to maintain satisfactory progress toward the degree. Continued enrollment is at all times subject to review on the basis of academic record. This review is performed by the Departmental Graduate Committee.

Residence Requirements

A total of at least 24 hours of graduate work must be taken in residence as defined in the "Academic Regulations" section of this catalog. No more than six hours may be accepted for transfer from other accredited institutions. Decisions as to the acceptability of transfer work will be made by the Chemistry Department. The student's research must be conducted on campus.

Admission to Candidacy

General academic regulations apply for admission to candidacy for the degree, continued enrollment and transfer credit.

MASTER OF SCIENCE IN ENGINEERING

The Master of Science in Engineering program provides an opportunity for graduate-level engineering education both to improve on-the-job skills and to provide an advanced degree program for career development. The College-wide degree program is to be of an applied and professional nature though flexible enough to permit inclusion of management, language arts, and other subjects appropriate for total career development. In most respects, the program is a one-year (30 hours) extension of the College's Bachelor of Science in Engineering program and is administered by the three participating departments — Engineering Analysis and Design; Engineering Science, Mechanics and Materials; and Urban and Environmental Engineering. Students desiring to enter the program must present evidence of satisfactory undergraduate preparation in engineering, usually manifested by possession of a baccalaureate degree in some accredited program of engineering.

Admission

All applicants must fulfill the general requirements for admission to graduate study at UNCC. (The Miller Analogies Test combined with the Doppelt Test of Mathematical Reasoning may be used in lieu of the GRE.) In addition, the College of Engineering requires each applicant to present evidence of satisfactory undergraduate preparation in engineering, usually manifested by the possession of a baccalaureate degree in some area of engineering. Acceptability for admission is based upon the applicant's records and background as determined by the department of the College of Engineering in which the applicant wishes to pursue his or her major area of study. The department has the prerogative to accept the applicant without reservation, to accept the applicant with conditions, or to reject the applicant. Any conditions are to be clearly stated and agreed to by the applicant before admission is completed.

Applicants with baccalaureate degrees from fields other than engineering (e.g., engineering physics, chemistry, mathematics, etc.) may be considered for admission to graduate study on a conditional basis. In engineering, such an applicant will be required to remove deficiencies in his or her engineering background as delineated by the department of engineering in which the applicant wishes to pursue his or her major area of study.

All conditional admissions are subject to the approval of the College's Engineering Graduate Committee (EGC). Also, subsequent evaluation of such students after completion of 12 hours of graduate work is subject to the approval of the EGC, as are requests for re-admission.

Degree Requirements

1. The satisfactory completion of a minimum of 30 hours of approved graduate credits as prescribed by the student's department and Advisory and Examining Committee and fulfilling the following:

   A minimum of 18 semester hours of graduate course credit in a major area of engineering, no more than six of which can be for a research thesis or a creative design project; or, alternatively, no more than three of which can be for a special problem report. The decision as to whether a program will include a thesis, design project, or problem report is to be made on an individual basis at the time of filing the student's Plan of Study (See page 42.)

   A minimum of 12 semester hours of approved elective graduate course credit, at least six of which must be in mathematics, science, or another engineering area. Inclusion of business and/or communication courses is permitted.

2. Of the required minimum of 30 semester hours, at least 18 must be in courses primarily for graduate students; i.e., no more than 12 hours of the required 30 can be in 300 or 400 level courses approved for graduate credit.

3. Academic Standards: Only the grades of *A, B,* or *C* shall be accepted as credit toward the MSE degree. A grade of *U* in any course will terminate the student's enrollment in the MSE program subject to re-admission as prescribed in the *Graduate Catalog.* Similarly, an accumulation of three *C* grades will result in termination of the student's enrollment, subject to re-admission to the program.

   A student in any graduate program is required to maintain satisfactory progress toward the degree. Continued enrollment is at all times subject to review on the basis of academic record and of actions with regard to observance of University rules and regulations.

   Students admitted to full standing will normally be permitted to re-enroll in successive terms, subject to satisfactory performance on course work and to load limitations imposed by their employers and the University. However, they must complete formal registration within the designated registration period. A student admitted conditionally to full standing will be permitted to continue, subject to satisfactory academic performance, until he or she has attempted 12 semester hours of graduate course work, at which time admission status will be reviewed by the major department and the EGC after which the student will be advised as to his or her eligibility to continue.

   Students admitted to non-degree status are admitted for one semester only and should fulfill requirements for admission to full standing by the application date for the following term if they wish to take additional course work.

   To qualify for the MSE degree, the student must have a grade point average of at least 3.00 based upon all courses acceptable for graduate credit for which he/she received a grade from the University.

4. Transfer and Residence Credit are to be in accordance with University regulations.

5. All work offered for the degree of Master of Science in Engineering must be completed within a six-year period.

Plan of Study and Admission to Candidacy

1. Plan of Study

   After completing at least nine but no more than 18 semester credit hours of graduate study, the student shall file a *Plan of Study.* This plan is formulated by the student with the advice and consent of the academic adviser and the student's Program Committee and submitted for approval to the major department and the College's Engineering Graduate Committee. This plan is to indicate all course work and any other requirements (thesis, project problems, deficiencies, etc.) which the student is expected to fulfill satisfactorily before the awarding of the MSE degree.

   Relatively minor changes in an approved Plan of Study (e.g., change in a date for when a course is to be taken, or a direct substitution of one course for another course *in the same area,* etc.) may be made at the discretion of the student's adviser and Program Committee, although such changes shall be so indicated in the student's Admission to Candidacy.

However, significant changes such as a change of adviser, change of research topic, change of minor area, etc., shall be submitted immediately to the EGC for its review to ensure that such changes conform to the existing guidelines for the MSE program.

2. Admission to Candidacy

Upon completion of a substantial amount of graduate work and in no case later than two weeks prior to the beginning of the semester in which the student expects to complete all requisites for the degree, the student shall file for Admission to Candidacy on a form supplied by the Graduate Office. This application is a checksheet approved by the adviser, department chairman, and the college dean listing all course work to be offered for the degree (including transfer credit and courses in progress). Upon receipt of this application, the Director of Graduate Studies will consult with the department concerned to arrange for the scheduling of the comprehensive examination(s).

Final Examination

Upon completion (or near completion) of all other degree requirements as indicated in the Admission to Candidacy, the candidate shall stand for a final comprehensive examination(s). This examination(s) (written, oral, or both) is to be set and administered by the student's Program Committee and is to cover those areas of study and/or research as deemed appropriate by the committee.

The result of this examination and the committee's recommendation as to the candidate's qualifications for the degree shall be transmitted to the EGC for review and subsequent transmittal to the proper University authority.

MASTER OF URBAN ADMINISTRATION

The primary objective of the Master of Urban Administration degree program is to provide a curriculum which offers professional training in public administration with a special emphasis on the management of local government systems. The curriculum emphasizes the analysis of the urban environment as well as the administrative decision-making approaches of urban administration.

Admission

Admission to the Master of Urban Administration program is open to qualified graduates of recognized colleges or universities accredited by a regional or general accrediting agency. There are six major requirements for admission: (1) Possession of a bachelor's degree, or its equivalent, from an accredited college or university; (2) An acceptable undergraduate record with an overall minimum Q.P.A. of 2.5; (3) A percentile score of at least 25 on the Graduate Record Examination or the Miller Analogies Test; (The GRE and Miller tests can be taken on the UNCC campus through the UNCC Counseling Center—597-2104); (4) A statement of professional career goals and a description of any significant work experience; (5) Three supporting letters of recommendation from professors or employers; (6) Submission of two official transcripts from all post high school institutions in which the candidate was enrolled.

Program Design

The Master of Urban Administration program is structured into three distinct phases: (1) Core; (2) Functional Specialization; and (3) Directed Study. In all, the program requires 36 hours of graduate credit for completion of the degree.

Core: All students are required to complete courses in each of the three core areas; (a) Survey of the Urban Environment; (b) Theory and Practice of Urban Administration; and (c) Administrative Analysis. The emphasis in the core area phase is twofold: achieving an overall perspective on the problems of urban administration *and* comprehending the various managerial and analytical approaches salient to the local governmental environment. After completion of the core requirements, each student must take a comprehensive examination before entering the next stage.

Functional Specialization: In this phase students are required to take courses in two or three areas of functional specialization: Budgeting and Economic Analysis; Personnel Management; or Information Systems and Program Evaluation. The selection of the courses is determined by the career needs of individual students.

Directed Study: Each Master's degree candidate is expected to complete a project on a topic of significance based on a field experience in urban administration. This requirement can be satisfied by individual experience gained through professional involvement in public administration or experience obtained through an approved internship with a governmental unit. This phase of the program is completed with a comprehensive exam.

Program Instruction and Scheduling

The methods of instruction employed in the program are designed to expose students to a variety of approaches to urban management. These methods include simulations, role playing, problem analysis, lectures and case studies. The ability to analyze complex managerial problems can be developed only by combining theoretical principles and practical administrative experience. The instructional program is designed to expose the student to both principles and experience.

Students may enroll in the Master of Urban Administration program on either a full-time or part-time basis. Classes are scheduled in the evening throughout the year. Full-time students may carry more than a normal course load (see page 49) only with the permission of their advisers.

STUDENT RESPONSIBILITY

Every student is responsible for the proper completion of his/her academic program, for familiarity with the *University Catalog*, for maintaining the grade average required and for meeting all other degree requirements, including attendance at the commencement exercises at which he/she will receive a diploma. The adviser will counsel, but the final responsibility remains that of the student.

A student is required to have knowledge of and observe all regulations pertaining to campus life and student deportment. He/she is responsible for maintaining communication with the University, by keeping on file with the Graduate Office at all times a current address, incuding zip code and telephone number.

Every student, while associated with the University, is expected to comport himself/herself in campus and community life in a manner that will reflect credit upon the student and the University.

GRADING–GRADUATE

The unit of measurement of University work is the semester hour. It ordinarily represents one lecture hour per week for one semester; however, a sequence of two or three laboratory hours is considered to be the equivalent of one lecture hour.

Letters are used to indicate the quality of work done. The significance of letter grades as applied to graduate courses is as follows:

A – Commendable
B – Satisfactory
C – Marginal
**U* – Unsatisfactory
I – Incomplete
***W* – Withdrew

*Unsatisfactory work or withdrew while doing marginal or unsatisfactory work.
**Withdrew while doing satisfactory or commendable work.

No grade is assigned to credit earned by examination, but such credit is identified by the letter "E" on a student's transcript.

Grades of A or B

A student enrolled in any graduate program should maintain satisfactory progress toward the degree. He/she is expected to achieve a commendable or satisfactory grade in all course work attempted for graduate credit.

Grade of C

An accumulation of three marginal (*C*) grades will result in termination of the student's enrollment in the graduate program. In order to continue the program of study, the student will be required to reapply and be reaccepted to the graduate program. Reapplication procedures are outlined on page 22.

Grade of U

If a student makes a grade of *U* on any course, enrollment will be terminated. In order to continue the program of study, the student will be required to reapply and be reaccepted to the graduate program. Reapplication procedures are outlined on page 22.

Grade of I

The grade of *I* is assigned at the discretion of the instructor when a student who is otherwise passing has not completed all the work in the course. The missing work must be completed during the next semester (fall or spring) in residence, but no later than 12 months after the term in which the *I* was assigned, *whichever comes first.* If the *I* is not removed during the specified time, a grade of *U* or *N/C* as appropriate is automatically assigned.

Grade of W

No grade will be given for a course dropped on or before the last day to drop a course with refund. After this period but before the last day to drop, a student who withdraws from a course will receive the grade of *W.* Courses given the grade of *W* do not count as hours attempted. The time of withdrawal is the time the drop card is accepted by the Registrar's Office.

Pass-No Credit Option

Certain courses such as research seminars, tutorials, internships or theses may be designated for *pass-no credit* grading upon recommendation of the offering department and approval of the Graduate Administrative Board. The grade of *P* in such a course shall be considered as evidence of satisfactory performance. A grade of *N/C* (no credit) will not affect eligibility for continued enrollment nor will it apply toward requirements for the degree.

Grading After Readmission

A student readmitted to the graduate program through the reapplication procedures will be expected to complete the degree program with satisfactory or commendable performance. Should the student receive a grade of *C* or *U* after being admitted to the program, his/her enrollment in the graduate program will be terminated.

Grade Reports

All students enrolled in the University receive reports of final grades from the registrar after the close of each term. Special reports of unsatisfactory achievement are sent to the students concerned near the middle of each regular semester.

Transcripts of Records

Upon written request by the student, an official transcript of the academic record will be issued to the person or institution designated, provided that all the student's obligations to the University have been settled satisfactorily.

Each student is entitled to one transcript without cost, regardless of how early in his academic career the request may be made. A fee of $1 per copy should accompany subsequent requests.

Requests should reach the Registrar's Office at least one week before the date the transcript is needed.

Teacher Certification

Students, having completed degree requirements and filed application for their degree, who wish graduate or special service certification as public school teachers must request such certification from the State Department of Public Instruction on a form obtained from the College of Human Development and Learning.

Registration for Graduate Credit

Registration in any course is limited to the first week of a semester and the first three days of classes of summer term. No graduate credit will be given to a student for a course unless he/she is properly registered for it.

Dual Registration

Undergraduate students at the University of North Carolina at Charlotte, who, by written request to the director of graduate studies, accompanied by the regular application form, indicate that they plan to undertake graduate study and who, in the last semester of residence, are required to take fewer than 12 semester hours of undergraduate work to fulfill all requirements for the bachelor's degree may be allowed during the final semester to enroll in certain courses for the purpose of obtaining graduate credit, provided prior approval is granted on a Special Action Form by the student's academic adviser, the instructor(s) of each graduate course(s), the dean of the college(s) in which the graduate course(s) is offered and the director of graduate studies, in that order. The total hours to be carried in this status shall not exceed 12 hours, of which no more than nine may be for graduate credit. On the basis of work attempted prior to the final semester, such student must meet the grade point criteria for admission to a graduate degree program at the University. No course for which credit is applied to an undergraduate degree may receive graduate credit. Permission to take graduate courses under dual registration does not constitute admission to any graduate degree program at the University.

ASSIGNMENT OF ACADEMIC ADVISERS

Each student entering a graduate degree program at the University of North Carolina at Charlotte will at the time of admission, be assigned an academic adviser or advisory committee from his/her field of interest. The adviser will endeav-

or to help each student develop the course of study best suited to the student's prior preparation and objectives. However, such assistance does not constitute a waiver of the student's personal responsibility as outlined at the beginning of these regulations.

CHANGING OF DEGREE PROGRAM

A student may change from one degree program or area of academic concentration to another provided he/she meets the prerequisities for admission to the new program and has the written approval of the dean of the college in which it is offered. Such approval should be forwarded to the Registrar through the Graduate Office.

COURSE LOAD

A load of nine semester hours constitutes a normal full semester program. The graduate student's load should be lower than the normal undergraduate load to encourage extensive reading, independent thinking and appropriate individual research.

Generally, graduate students may not register for more than 12 semester hours during any semester without advance written approval signed by the dean of the student's major college indicating that the dean has found that extraordinary circumstances warrant the exception. In cases where there is not an appropriate dean to give such approval, approval for registration in excess of 12 semester hours may be sought through the Office of the Vice Chancellor for Academic Affairs.

Course load is dependent upon two factors: the scholastic ability of the student and the time available for study. Full-time professional public school employees are limited to one course each semester during the academic school year. Others whose full-time employment totals 40 hours a week should not carry more than seven semester hours.

ADDING OR DROPPING A COURSE

In order to add or drop a course after the registration period, a student must secure written permission from his/her adviser and complete the necessary procedure as prescribed by the Registrar's Office. No student will be permitted to add a course or change sections of a course after the first week of a semester or the first three days of classes in a summer term.

A student who withdraws from a course after the last day to receive a refund will receive a grade of *W*.

WITHDRAWAL

Any student voluntarily leaving the University before the close of the term must withdraw officially. He/she initiates the withdrawal procedure by scheduling a conference with the Graduate Office. A student who is unable to appear in person may notify the Graduate Office of his withdrawal by letter.

Any student who leaves the University before the close of a term without withdrawing officially will receive a grade of U in all courses for which he/she is registered. A student who is taking only one course must withdraw officially from the University if he/she drops the course.

TRANSFER CREDITS

At the time of admission, up to six hours transfer credit may be accepted from another accredited institution upon approval of the student's adviser and the dean of his major college.

Courses accepted for transfer credit must be appropriate to the University program and curriculum in which the student is enrolled.

The grade in any course accepted for transfer credit must be the equivalent of that awarded for commendable or satisfactory work as defined by the University of North Carolina at Charlotte.

Courses accepted for transfer are subject to the same time limitation as courses taken in residence.

RESIDENCE CREDIT

Residence credit is credit that is earned under the conditions specified herein and may be applied toward the attainment of graduate degrees at the University of North Carolina at Charlotte. These conditions must be satisfied regardless of the location in which the course is given:

1. Instruction: The instructor must be a member of the Graduate Faculty of UNCC, or "especially qualified" for a particular course under GAB policy.

2. Course(s): The content of each course must be approved by regularly established college and university curricular processes before the course is scheduled or offered.

Residence credit may also be awarded by virtue of an examination administered by the faculty of the college offering credit. A student may also, with the prior approval of the appropriate University of North Carolina at Charlotte college(s), take graduate courses for residence and course credit at other accredited institutions.

CREDIT BY EXAMINATION

A candidate for a degree may receive credit for work appropriate to that degree by successful performance on an examination given by the faculty of the college offering the credit. (See page 58.) Credit by examination does not carry a letter grade but will be entered on the transcript as "*E*."

ADMISSION TO CANDIDACY

Upon successful completion of a maximum of 18 semester hours of graduate work and in no case later than two weeks prior to the beginning of the semester in which he/she expects to complete all requisites for the degree, a student should file for *Admission to Candidacy* on a form supplied by the Graduate Office. This application is a check sheet approved by the student's adviser, department chairman and college dean listing all course work to be offered for the degree (including transfer credit and courses in progress.)

Upon receipt of this application, the Director of Graduate Studies will consult with the department concerned to arrange for the scheduling of the comprehensive examination(s) and composition of the examining committee.

APPLICATION FOR THE DEGREE

Each student should make application for the degree on a form obtained from the Graduate Office no later than the filing date specified in the University calendar. The application must be accompanied by the appropriate filing fee in effect at the time of application. Degrees are awarded only at commencement exercises held at the end of the spring semester; however, the diploma will reflect the term in which all requirements were completed.

TIME LIMIT

All work offered for the master's degree must be completed within a six-year period.

POLICY ON SECOND MASTER'S DEGREE

A student is permitted to earn a second master's degree subject to the following conditions: (1) no work applied to a previously awarded degree may be applied to the new degree program; (2) the student must gain admittance to a degree program different from that of his/her previous graduate degree(s), and (3) the student must successfully meet all requirements for the new degree.

APPEAL PROCEDURE

Any student or applicant may appeal any decision affecting his/her status as a graduate student by submitting a written petition to the Appeals Committee of the Graduate Administrative Board after remedies have been exhausted in the appropriate college. The petition shall briefly describe the facts which support his claim and the remedy being sought. The petition must be submitted within six calendar months of notification of the action being appealed. After receiving the petition, the chairman of the appeals committee will schedule a hearing as soon as possible. A hearing will be held within 60 days of receipt of the written petition of appeal. Evidence will be received from the petitioner and other parties having information bearing on the appeal. The chairman of the appeals committee shall report its decision on any appeals matter a) directly to the Director of Graduate Studies and b) to the Graduate Administrative Board at the first board meeting

following the hearing. The Director of Graduate Studies shall advise the petitioner in writing of the decision of the Appeals Committee within 30 days after the end of the hearing.

FINANCIAL INFORMATION

TUITION AND FEES

Charges for graduate tuition and fees vary according to the student's status as a resident or nonresident of North Carolina. A nonresident student must pay a higher rate of tuition than a legal resident.

Tuition and fees are due and payable on the day of registration. Checks and money orders should be made payable to the University of North Carolina at Charlotte.

Students taking seven or more semester hours of work during a regular semester will be charged full tuition and fees. Students taking less than seven hours of work during a semester will be charged at the approved rate per semester hour of instruction plus a portion of the General Fee. The following graduate tuition and fee structure is in effect for the 1980-81 academic year. The University reserves the right to make changes in tuition and fees at any time (with approval of proper authorities). Non-degree students who are taking only undergraduate courses will pay tuition and fees at the undergraduate rate.

Graduate Tuition and General Fees Per Semester

	1 hr	*2 hr*	*3 hr*	*4 hr*	*5 hr*	*6 hr*	*7 hr*	*8 hr*	*9 or more*
In-State Resident	43.50	66.50	89.50	112.50	135.50	191.00	208.00	208.00	280.00
Out-of State Resident	275.50	275.50	531.50	531.50	531.50	819.00	819.00	819.00	1146.00

NOTE: Residence hall space is not available to students carrying less than a full load. Information concerning cost of on-campus room and board may be obtained from the Director of Residence Life.

The University reserves the right to make, with the approval of proper authorities, changes in tuition and fees at any time.

REFUNDS

A student who officially withdraws from the University will receive a refund as follows:

a. During the first two weeks of the semester a 90 percent refund of tuition and fees.

b. During the third and fourth week of the semester a 40 percent refund of tuition and fees.

c. After the first four weeks, tuition and fees are not refundable.

Exception: After four weeks charges are refundable by administrative action on a prorata basis for the unexpired portion of the term for the following reasons; death of the student, withdrawal for adequate medical reason as certified by the University Student Health Center or family doctor, death in the immediate family which necessitates student withdrawing and dismissal or suspension from school.

Summer School: A student who offically withdraws from the University as indicated below will receive a refund of the full amount paid less a registration fee of $10.00; regular summer session during the first *five* class days; three week session during the first *three* class days; two week session during the first *two* class days. No other refunds are authorized except as follows: death of student, withdrawal for adequate medical reason as certified by the University Student Health Center or family doctor, death in the immediate family which necessitates student withdrawing and dismissal or suspension from school.

Housing

Admission to UNCC does not guarantee residence hall space. Arrangements for on-campus housing are made, after admission, with the director of residence life. On-campus housing is not available for married or part-time students.

All housing applications must be submitted with a $50 prepayment. The prepayment is applied to spring semester room and board charges. No prepayment refunds for fall semester are made after July 1. No refunds for spring semester reservations are made after December 1.

RESIDENCY STATUS

University Statement on Residence Status for Tuition Payment

Quotation verbatim of the current North Carolina law on this subject:

ARTICLE 14.

General Provisions as to Tuition and Fees in Certain State Institutions.

§ 116-143.1. Provisions for determining resident status for tuition purposes.—(a) As defined under this section:

(1) A "legal resident" or "resident" is a person who qualifies as a domiciliary of North Carolina; a "non-resident" is a person who does not qualify as a domiciliary of North Carolina.

(2) A "resident for tuition purposes" is a person who qualifies for the in-State tuition rate; a "nonresident for tuition purposes" is a person who does not qualify for the in-State tuition rate.

(3) "Institution of higher education" means any of the constitutent institutions of the University of North Carolina and the community colleges and technical institutes under the jurisdiction of the North Carolina State Board of Education.

(b) To qualify as a resident for tuition purposes, a person must have established legal residence (domicile) in North Carolina and maintained that legal residence for at least 12 months immediately prior to his or her classification as a resident for tuition purposes. Every applicant for admission shall be required to make a statement as to his length of residence in the State.

(c) To be eligible for classification as a resident for tuition purposes, a person must establish that his or her presence in the State currently is, and during the requisite 12-month qualifying period was, for purposes of maintaining a bona fide domicile rather than of maintaining a mere temporary residence or abode incident to enrollment in an institution of higher education.

(d) An individual shall not be classified as a resident for tuition purposes and, thus, not rendered eligible to receive the in-State tuition rate, until he or she has provided such evidence related to legal residence and its duration as may be required by officials of the institution of higher education from which the individual seeks the in-State tuition rate.

(e) When an individual presents evidence that the individual has living parent(s) or court-appointed guardian of the person, the legal residence of such parent(s) or guardian shall be prima facie evidence of the individual's legal residence, which may be reinforced or rebutted relative to the age and general circumstances of the individual by the other evidence of legal residence required of or presented by the individual; provided, that the legal residence of an individual whose parents are domicile outside this State shall not be prima facie evidence of the individual's legal residence if the individual has lived in this State the five consecutive years prior to enrolling or reregistering at the institution of higher education at which resident status for tuition purposes is sought.

(f) If making domiciliary determinations related to the classification of persons as residents or nonresidents for tuition purposes, the domicile of a married person, irrespective of sex, shall be determined, as in the case of an unmarried person, by reference to all relevant evidence of domiciliary intent. For purposes of this section:

(1) No person shall be precluded solely by reason of marriage to a person domiciled outside North Carolina from establishing or maintaining legal residence in North Carolina and subsequently qualifying or continuing to qualify as a resident for tuition purposes;

(2) No person shall be deemed solely by reason of marriage to a person domiciled in North Carolina to have established or maintained a legal residence in North Carolina and subsequently to have qualified or continued to qualify as a resident for tuition purposes;

(3) In determining the domicile of a married person, irrespective of sex, the fact of marriage and the place of domicile of his or her spouse shall be deemed relevant evidence to be considered in ascertaining domiciliary intent.

(g) Any nonresident person, irrespective of sex, who marries a legal resident of this State or marries one who later becomes a legal resident, may, upon becoming a legal resident of this State, accede to the benefit of the spouse's immediately precedent duration as a legal resident for purposes of satisfying the 12-month durational requirements of this section.

(h) No person shall lose his or her resident status for tuition purposes solely by reason of serving in the armed forces outside this State.

(i) A person who, having acquired bona fide legal residence in North Carolina, has been classified as a resident for tuition purposes but who, while enrolled in a State institution of higher education, loses North Carolina legal residence, shall continue to enjoy the in-State tuition rate for a statutory grace period. This grace period shall be measured from the date on which the culminating circumstances arose that caused loss of legal residence and shall continue for 12 months; provided, that a resident's marriage to a person domiciled outside of North Carolina shall not be deemed a culminating circumstance even when said resident's spouse continues to be domiciled outside of North Carolina; and provided, further, that if the 12-month period ends during a semester or academic term in which such a former resident is enrolled at a State institution of higher education, such grace period shall extend, in addition, to the end of that semester or academic term. (1971, c. 845, ss. 7-9; 1973, cc. 710, 1364, 1377; 1975, c. 436.)

University regulations governing residential classification of students are set forth in detail in "A Manual To Assist the Public Higher Education Institutions of North Carolina in the Matter of Student Residence Classification for Tuition Purposes." Each enrolled student is responsible for knowing the contents of this manual. Copies of the manual are available in the Registrar's Office for inspection upon request.

Application Fee

Applicants for admission to a degree program are required to submit a $10 application fee with the application form. The fee is not deductible and is not refundable. An equivalent fee must accompany each application for readmission where permission to reenroll is not granted as a matter of routine.

Late Registration Fee

A fee of $10 will be charged for those registering after the designated registration period each semester. *The fee is not refundable.*

Applicants completing their applications before the application deadline but whose applications could not be processed in time will not be assessed the late registration fee if required to register late.

Returned Check Policy

In the event that a check is returned by the bank, a certified letter will be sent to the maker, informing him or her that a penalty of $5 has been assessed and the account must be settled within five (5) working days or the University will consider the check to be a bad check and will process it accordingly. A hold will be placed on the student's record until the bad check is covered and the penalty is paid. The student will also be dropped from enrollment for the current session and will not be allowed to re-enroll until the check is cleared.

Graduation Fee

Each member of the graduating class must pay a graduation fee of $18 at the time he/she applies for the degree. No reduction in fees is allowed for those re-

ceiving degrees *in absentia*. For graduate students, the cost of renting a hood is in addition to the $18 charge.

Credit by Examination Fee

Fees for credit by examination are as follows: A written examination for a course will require a fee of $15. A laboratory examination requiring the arrangement of such things as laboratory materials will require a fee of $25. A combination of a laboratory and written examination will require a fee of $30.

Student Activities Fee

A part of the general fee provides students with a program of cultural, recreational and entertainment activities. It pays for admission to most athletic contests, dramatic productions, activities sponsored by the Student Activities Board, social and entertainment functions and for subscriptions to the newspaper and literary magazine. The yearbook is provided free to all students taking eight or more semester hours of each semester during the academic year. Other students may obtain a yearbook upon payment of $8.50.

Registration of Motor Vehicles

Any student attending the University is required to register his motor vehicle(s) in order to park such vehicle(s) on campus. Only vehicles owned by the student, his spouse, his parent(s), or his guardian may be registered. Unless increased by the chancellor, the number of vehicles which a student may register is two. Presentation of State vehicle registration or appropriate proof of ownership shall be required.

Registration of motor vehicles is to be accomplished as part of the University registration at the beginning of the fall semester of each year or at the time when the student first registers in the University and at the beginning of the fall semester of each year thereafter. A motor vehicle acquired by a student during a semester is to be registered.

*Motor Vehicle Registration Fee**

The motor vehicle registration fee for students, faculty and staff members is as follows:

$30 per academic year beginning with the fall semester.
$18 for the period beginning with the spring semester and ending with the beginning of the next fall semester;
$12 for the period beginning with a summer term and ending with the beginning of the next fall semester;
$10 for each semester, fall and spring and summer in parking areas designated for night students after 4:00 p.m. ("N" permits may park at meters or visitors' parking lot from 8:00 a.m. to 4:00 p.m.)

*Fees are subject to change.

$ 2 for one additional motor vehicle;
$ 1 for a replacement sticker from one category to another with presentation of residue of old decal

Violators of University Parking Regulations will incure a civil penalty of $3.00, $5.00, $10.00 or $15.00, depending on the seriousness of the violation. If not paid in five days, the penalty will be doubled and applied to the member's account with the University and collectable as a bad debt. Subsequent registration may be withheld for non-payment.

Temporary Parking Permits

Temporary parking permits are available for persons with cars registered on campus who are required to drive a non-registered car for a short period while the registered car is being repaired, for new employees prior to receipt of first pay check, and short-term visitors of resident students.

Education for the Vocationally Handicapped

Students who have suffered a disability which renders them vocationally handicapped are eligible for aid provided by the North Carolina State Division of Vocational Rehabilitation. This aid takes the form of services which include vocational counseling and guidance and placement. Payment of expenses such as training, medical treatment, room and board, books, fees and tuition may be available. A vocational rehabilitation officer is available in Charlotte for interviewing applicants. Appointments may be made by contacting the Vocational Rehabilitation Office located at 316 East Morehead, 375-8686.

Veterans Benefits

The Office of the Registrar works with the Veterans Administration to assist in administering the various programs of benefit to veterans or eligible relatives of veterans. The veterans clerk in the Registrar's Office certifies enrollment and transmits necessary credentials and information to the proper Veterans Administration Office.

Admission to the University should be obtained before the student makes application for veteran's benefits. Application for a certificate of eligibility should be made to the nearest Veterans Administration Regional Office at least six weeks before the expected date of enrollment.

In order to be eligible for the full monthly allowance under any of the above laws, an undergraduate student must be enrolled for 12 or more semester hours of work, while a graduate student must be enrolled for nine or more semester hours. Those enrolled for fewer semester hours than the limits stated above will be eligible for part-time compensation. Students are responsible for reporting any change in enrollment status to the veterans clerk in the Office of the Registrar.

Financial Aid

The University has a limited number of graduate assistantships in the fields of biology, chemistry, political science, mathematics and geography. Such financial support will be extended to other areas of study as rapidly as resources become available. Application for a graduate assistantship should be filed in writing with the appropriate department through the director of graduate studies not later than the February preceding the fall semester for which the assistantship is desired.

Financial Aid is available to graduate students who are United States citizens. North Carolina residence is frequently one of the eligibility requirements for graduate participation in grant aid programs.

For purposes of financial aid, a full-time student is defined as one who is taking a minimum of nine semester hours of course work. The student receiving financial assistance from the University must be working toward a degree and not simply taking graduate courses.

Graduate students will also be considered for University employment upon request. However, all graduate students seeking employment must have the approval of their department heads.

Short term loans for periods up to 30 days are also available for graduate students. These loans are of an emergency nature and may be applied for in the Student Financial Aid Office.

For information and application for financial aid, contact the Student Financial Aid Office, Atkins Library, University of North Carolina at Charlotte, UNCC Station, Charlotte, North Carolina 28223.

Placement Service

The Placement Office (located in Room 01, Atkins Library) functions as the central placement agency for the campus and serves graduate students, undergraduates, and alumni by assisting them in developing their career objectives (preferably beginning with their admission to the University) and in obtaining employment. Services include career planning and guidance; advising on the techniques of employment prospecting, on job selection and analysis, on interviewing, on the preparation of resumes and writing of business letters; maintaining, for student browsing, files of information on prospective employers (business firms, governmental agencies, school systems) and on graduate school fellowships and assistantships; providing liaison between employers or graduate schools and graduates through on-campus recruiting by employers and graduate school representatives and by individual referral for current employment openings.

Students who wish to earn part of their educational expenses or to gain work experience may register for part-time, full-time or summer employment off campus. Every effort is made to assist the student who expresses a need for employment and, where possible, to place him/her in a position relating to his/her vocational goal.

Degree candidates register with the Placement Office on a voluntary basis early in their graduating year by completing a resume and requesting three professors and/or employers to complete confidential evaluations on forms provided by the Placement Office. At the present time, these credentials are retained on a permanent basis.

The Family Educational Rights and Privacy Act of 1974 provides that the release of these credentials or information in the file must be authorized in writing by the registrant unless the information is a matter of public record, and that under certain conditions each student may have the right to review his/her placement file (resume and evaluations) and to obtain a copy of it for a fee.

All employers and schools interviewing on campus or listing openings with the Placement Office must indicate that they are equal opportunity employers, that is, that in hiring, compensation, promotion, training or admission they do not discriminate on the basis of race, color, religion, sex or national origin.

Following are graduate courses offered by the University of North Carolina at Charlotte, listed by colleges and under the department or academic area concerned.

Courses are listed with the departmental abbreviation, course number, title of the course, the semester hours credit given in parenthesis, prerequisites, if any, and a description of the subject matter covered, with whatever requirements of class or laboratory hours are applicable. If no class hours are given, the number of class sessions per week is the same as the number of semester hours credit for the course.

The student must arrange his program in consultation with his major college of academic or professional concentration. Students intending to teach should consult both the major department and the College of Human Development and Learning.

College of Arts and Sciences

Dean: Professor Burson

The College of Arts and Sciences offers the degrees of Master of Arts in English, Geography, History, and Mathematics; Master of Arts in Education in Mathematics; Master of Science in Biology and Chemistry, and Master of Urban Administration. The College also offers graduate courses in foreign languages, physics, political science, psychology, religion, sociology, and anthropology.

BIOLOGY

Chairman: Professor Trumbore

Courses for Graduate Credit

The graduate student may select courses from the following list. Selection of courses will depend upon the background of the student; the potential candidate must demonstrate competence in the areas of plant, animal and cell biology. These course offerings will allow a foundation for breadth of training and pursuit of a specialty.

Courses for Advanced Undergraduates and Graduates

BIO 311. MICROBIOLOGY. (3) Prerequisite: BIO 111 and two semesters of chemistry. Morphology, biochemistry, physiology and methods of culture and control of microscopic organisms. Three lecture hours a week.

BIO 311L. MICROBIOLOGY LABORATORY. (1) Prerequisite or corequisite: BIO 311. One laboratory period of three hours a week.

BIO 319. PLANT SYSTEMATICS. (4) Prerequisite: BIO 211. Identification and classification of vascular plants, including experimental concept of speciation. Two lecture hours and two laboratory periods of two hours each week.

BIO 321. VERTEBRATE ZOOLOGY. (4) Prerequisite: BIO 221 or consent of department. Taxonomy, anatomy, physiology and life histories of vertebrates with emphasis on local forms. 321A - Icthyology, 321B - Herpetology, 321C - Ornithology, 321D - Mammology. Three lecture hours and one laboratory period of three hours a week.

BIO 323. PARASITOLOGY. (4) Prerequisite: BIO 221. Morphology, life cycles, ecology, taxonomy and economic importance of parasites. Three lecture hours and one laboratory period of three hours a week.

BIO 325. INVERTEBRATE ZOOLOGY. (4) Prerequisite: BIO 221. Taxonomy, anatomy, physiology and life histories of selected invertebrates. Three lecture hours and one laboratory period of three hours a week.

BIO 331. GENETICS. (3) Prerequisites: BIO 111 and CHE 102. Basic concepts of heredity: principles of classical and molecular genetics. Three lecture hours a week.

BIO 331L. GENETICS LABORATORY. (1) Prerequisite or corequisite: BIO 331. One laboratory period of three hours a week.

BIO 333. PLANT GROWTH AND DEVELOPMENT. (4) Prerequisite: BIO 211. Growth and development of plants with emphasis on structural and chemical differentiation. Three lecture hours and one laboratory period of three hours a week.

BIO 338. EMBRYOLOGY. (3) Prerequisite: BIO 221. Developmental processes occurring chiefly during gametogenesis, fertilization, early embryogenesis and organogenesis. Three lecture hours a week.

BIO 338L. EMBRYOLOGY LABORATORY. (1) Prerequisite or corequisite: BIO 338. One laboratory period of three hours a week.

BIO 345. COMPARATIVE VERTEBRATE ANATOMY. (4) Prerequisite: BIO 221. Comparative studies of the anatomy, physiology and functional adaptations of selected vertebrates with emphasis on evolutionary developments, especially in mammals. Three lecture hours and one laboratory period of three hours a week.

BIO 347. HISTOLOGY. (4) Prerequisites: BIO 111 and CHE 102. Animal tissues and organs; techniques for preparing tissues for analysis. Two lecture hours and two laboratory periods of two hours a week.

BIO 352. VERTEBRATE PALEONTOLOGY. (3) Prerequisite: BIO 221 or consent of department. Evolution of vertebrate animals from the first fishes to man. Three lecture hours a week.

BIO 355. ANIMAL BEHAVIOR. (3) Prerequisite: BIO 221 or consent of department. An ethological approach to how animals respond to their environment. Causation, development and adaptive significance of behavior in social systems. Three lecture hours a week.

BIO 355L. ANIMAL BEHAVIOR LABORATORY. (1) Prerequisite or corequisite: BIO 355. One laboratory period of three hours a week.

BIO 361. ECOLOGY. (3) Prerequisites: BIO 211, 221, and one course in chemistry. Interrelationships of organisms and their environment. Three lecture hours a week.

BIO 361L. ECOLOGY LAB. (1) Prerequisite or corequisite: BIO 361. Three hours laboratory a week.

BIO 369. ENVIRONMENTAL PROBLEMS. (3) Air, water and land pollution; resource depletion; and over-population. Three lecture hours a week.

BIO 373. PLANT PHYSIOLOGY. (4) Prerequisites: BIO 211 and CHE 102. Metabolic and physiological processes of plants and conditions which affect or regulate these processes. Three lecture hours and one laboratory period of three hours a week.

BIO 375. ANIMAL PHYSIOLOGY. (4) Prerequisites: BIO 221 and CHE 102. Fundamental control mechanisms which operate to maintain the homeostatic state. Three lecture hours and one laboratory period of three hours a week.

BIO 391. RADIATION BIOLOGY. (3) Prerequisites: BIO 221 and CHE 231. Biological effects of ionizing radiation on living matter. Three lecture hours a week.

BIO 395. SPECIAL TOPICS IN BIOLOGY. (1-4). May be repeated for credit. Prerequisites and course hours vary with topics. Used to comply with requests for special topics and advanced studies in biology. Lecture hours and laboratory hours will vary with the courses taught.

BIO 413. EPIDEMIOLOGY. (3) Prerequisite: BIO 311 or 323 or 361. Concepts of epidemiology including disease agents and disease transmission; patterns of epidemic and endemic diseases. Three lecture hours a week.

BIO 431. MOLECULAR BIOLOGY. (3) Prerequisites: BIO 331 and CHE 232. Structural and functional interaction of nucleic acids and proteins in the replication, transcription, and translation of genetic material. Three lecture hours a week.

BIO 437. CYTOGENETICS. (4) Prerequisite: BIO 331. Plant and animal cells, with emphasis on problems of chromosomal organization, function and behavior, including the role of chromosome number and aberrations in speciation and evolution. Three lecture hours and one laboratory period of three hours a week.

BIO 451. EVOLUTION. (3) Prerequisite: BIO 331 or 335. Theories of evolution and forces which affect gene frequencies. Three lecture hours a week.

BIO 455. ANIMAL COMMUNICATION. (3) Prerequisites: BIO 355 or PSY 310. Behavioral and structural analyses of sensory mechanisms involved in the transfer of information between individuals, with emphasis on bioacoustics; communication strategies, analytical techniques and sound identification of selected species. Two lecture hours and one laboratory period of three hours a week.

BIO 457. WILDLIFE BIOLOGY. (3) Prerequisite: BIO 361. Concepts, principles and techniques of wildlife biology. Identification and life histories with emphasis on the value, study, attraction, management, conservation and control of wildlife species. Three lecture hours a week.

BIO 457L. WILDLIFE BIOLOGY LABORATORY. (1) Prerequisite or corequisite: BIO 457. One laboratory period of three hours a week plus field trips.

BIO 461. LIMNOLOGY AND OCEANOGRAPHY. (4) Prerequisite: two courses in chemistry. Geological, physical, chemical, and biological aspects of lakes, streams and oceans. Three lecture hours and one laboratory period.

BIO 462. COMMUNITY ECOLOGY. (3) Prerequisite: BIO 361. Community structure, species composition, energy flow, nutrient cycles and succession. Three lecture hours a week.

BIO 462L. COMMUNITY ECOLOGY LABORATORY. (1) Corequisite: BIO 462. Quantitative study of a forest ecosystem on the UNCC Ecological Reserve. One laboratory period of three hours a week.

BIO 473. IMMUNOLOGY. (4) Prerequisite: BIO 311, and CHE 231. Selected topics including fundamental aspects of antigens and antibodies, their structure, specificities and reactions on cellular and molecular levels. Three lecture hours a week.

BIO 473L. IMMUNOLOGY LABORATORY. (1) Prerequisite or corequisite: BIO 473. One laboratory period of three hours a week.

BIO 474. VIROLOGY. (4) Prerequisites: BIO 311, 311L and CHE 232. Morphology, classification, genetics and pathogenicity of bacterial, plant and animal viruses. Three lecture hours and one laboratory period of three hours a week.

BIO 475. ENDOCRINOLOGY. (3) Prerequisites: BIO 375 and CHE 231. Endocrine glands and their physiological roles in metabolism, growth and reproduction. Three lecture hours a week.

BIO 475L. ENDOCRINOLOGY LABORATORY. (1) Prerequisite or corequisite: BIO 475. One laboratory period of three hours a week.

BIO 476. COMPARATIVE INVERTEBRATE PHYSIOLOGY. (1) Prerequisites: BIO 221, CHE 231 or consent of department. Maintenance of body fluids, acquisition, processing and distribution of nutrient materials; gas exchange; movement and coordination. Three lecture hours a week.

BIO 476L. COMPARATIVE INVERTEBRATE PHYSIOLOGY LABORATORY. (1) Prerequisite or corequisite: BIO 476. One laboratory period of three hours a week.

BIO 477. CELL PHYSIOLOGY. (3) Prerequisites: BIO 111 and CHE 231. The fundamental physiochemical properties of cells. Three lecture hours a week.

BIO 484. RADIOISOTOPE TECHNIQUES. (4) Prerequisites: one semester of chemistry. Use of radioisotopes in science; properties of sub-atomic particles, instrumentation, safety procedures and radioisotope labeling. Three lecture hours and one laboratory period of three hours a week.

BIO 538. MECHANISMS IN DEVELOPMENT. (3) Prerequisite: BIO 338 or consent of department. Cellular and molecular bases of differentiation; an exploration of the experimental analysis of causal and controlling factors in development. Three lecture and discussion hours a week.

BIO 561. POPULATION ECOLOGY. (3) Prerequisite: BIO 361. Population growth, regulation and reproductive strategies; competition and predator-prey interactions; evolutionary ecology. Three lecture hours a week.

BIO 561L. POPULATION ECOLOGY LABORATORY. (1) Corequisite: BIO 561. One laboratory period of three hours a week.

BIO 572. MARINE MICROBIOLOGY. (4) Prerequisites: BIO 311 and 311L. Bacteria, fungi, and viruses of marine origin, and their response to the salt, temperature, pressure and nutrient environment of the ocean. Roles of marine microorganisms in public health, pollution and fouling. Three lecture hours and one laboratory period of three hours a week.

BIO 577. NEUROBIOLOGY. (3) Prerequisite: BIO 111 or consent of instructor. Physiology and anatomy of nervous systems. Three lecture hours a week.

BIO 577L. NEUROBIOLOGY LABORATORY. (1) Prerequisite or corequisite: BIO 577. One laboratory period of three hours a week.

Courses for Graduate Students Only

The following courses are designed to allow the student to obtain an in-depth exposure to certain areas in biology. The tutorial courses will provide a foundation for the student's research endeavor; it may be tailored to supplement the student's research endeavor; it may be tailored to supplement the student's specialization area. Courses numbered 691, 693 and 695 may be repeated for credit.

BIO 691. SEMINAR. (1-2) Four hours are required. Topics of current emphasis in biology.

BIO 693. SPECIAL TOPICS IN BIOLOGY. (1-4) May be repeated for credit. Prerequisite: consent of department. Courses in selected topics and advanced studies in biology. Lecture and laboratory hours will vary with the courses taught.

BIO 695. TUTORIAL. (1-4) Four hours are required. Directed study in areas of specialization in biology and related fields.

BIO 697. RESEARCH AND THESIS. Credit up to 8 hours.

CHEMISTRY

Chairman: Professor Gibson

COURSE DESCRIPTIONS

Courses for Advanced Undergraduates and Graduates

CHE 411. INSTRUMENTAL ANALYSIS. (4) Prerequisites: CHE 311, 341, 341L. A discussion of modern electrochemical and chromatographic techniques

and of ultraviolet, infrared, NMR, ESR, Raman and mass spectroscopy. The discussion includes theory and practice, with considerable attention given to the instrument and elementary electronics involved in the techniques. Two lecture hours and two three-hour laboratory periods per week.

CHE 412. APPLIED MINICOMPUTER INTERFACING IN CHEMISTRY. (4) Prerequisite: departmental approval. Three lecture hours and one laboratory period of three hours each week. The background needed to apply minicomputer interfacing in chemical research, including machine language programming unique to DEC PDP-8 family minicomputers and elementary digital electronics, will be presented. Application of computer automation in chemical research will be discussed. The laboratory will involve individual projects concerned with the design, development and implementation of the software and hardware needed to solve an interfacing project by the student. The course is designed to provide a foundation for the use of computer automation in research. No background in programming or electronics is required.

CHE 421. ADVANCED INORGANIC CHEMISTRY. (4) Prerequisites: CHE 342, 342L. Theoretical inorganic chemistry including the application of physicochemical principles to the study of inorganic systems. Laboratory work involving inorganic preparations and characterization techniques. Three lecture hours and one laboratory period of three hours per week.

CHE 431. ADVANCED ORGANIC CHEMISTRY. (4) Prerequisites: CHE 232, 232L, and 311. Recent developments in organic chemistry. Laboratory techniques of organic chemistry with emphasis on qualitative organic analysis including instrumental methods. Two lecture hours and two laboratory periods of three hours per week.

CHE 445. ADVANCED PHYSICAL CHEMISTRY. (3) Prerequisite: CHE 342. Topics selected from quantum chemistry and/or statistical thermodynamics. Three lecture hours per week.

CHE 475. PHYSICAL BIOCHEMISTRY. (3) Prerequisites: CHE 232, 232L, and 341. Colloid systems, equilibria in biological fluids, mass and energy transport in fluids and in association with membranes, energy storage and dissipation with relation to specific chemical bonding, enzyme kinetics. Three lecture hours per week.

CHE 590. SPECIAL TOPICS IN CHEMISTRY. (1-4) Prerequisite: consent of the department. May be repeated for credit. Lectures and/or laboratory hours will vary with the nature of the course taught. Selected topics in chemistry.

Courses for Graduate Students Only

CHE 615. ADVANCED ANALYTICAL CHEMISTRY. (3) Prerequisite: CHE 411. The application of modern analytical methods to chemical problems. Emphasis is upon the chemical information, particularly structural, obtainable from these techniques. Three lecture hours per week.

CHE 625. THEORETICAL INORGANIC CHEMISTRY. (3) Prerequisite: CHE 421. Group theoretical treatment of current theories of inorganic chemistry. Top-

ics covered: Ligand field theory, molecular orbital theory for complex ions, electronic spectra of complex ions and the magnetic properties of complex ions. Three lecture hours per week.

CHE 635. ADVANCED ORGANIC CHEMISTRY. (3) Prerequisite: CHE 431. A qualitative discussion of modern mechanistic interpretation of the relations between structure and reactivity. Special emphasis is placed on the role of reactive intermediates such as carbonium ions, carbanions, carbenes and radicals. Three lecture hours per week.

CHE 645. CHEMICAL THERMODYNAMICS. (3) Prerequisite: CHE 342. The postulatory basis of classical thermodynamics. Problems in chemical thermodynamics. The use of statistical mechanics for calculating thermodynamic functions. Three lecture hours per week.

CHE 646. RATES AND MECHANISMS. (3) Prerequisite: CHE 342. Consideration of chemical kinetics and mechanism schemes, particularly those of current interest. Three lecture hours per week.

CHE 650. SEMINAR-INTERNSHIP. (Variable credit, up to 3). Required for all teaching assistants and for those students planning teaching careers. Prerequisite: consent of department. Consideration of topics and trends in chemical education. Opportunities for supervised experience in the teaching of college chemistry will be offered. Graded *Pass/No Credit.* May be repeated for credit.

CHE 660. SPECIAL TOPICS AND INVESTIGATIONS. (Variable credit, up to 3). Prerequisite: consent of department. Directed study of topics of current chemical interest. May be repeated for credit.

CHE 680. RESEARCH SEMINAR. (1) Individual investigation and exposition of the results. May be repeated for credit.

CHE 680P. RESEARCH SEMINAR. (1) Discussion of recent developments and special topics in chemistry. Graded *Pass/No Credit.*

CHE 690. RESEARCH AND THESIS. (Variable credit, up to 16) Laboratory research for the thesis.

ENGLISH

Awards

The Andreas Bakis Prize is awarded annually to a graduate student for outstanding performance in the study of the English language.

The Ethel Katopodis Award is presented annually to a graduate student for academic excellence in the study of English.

Chairman: Professor Mason

COURSE DESCRIPTIONS

Courses for Advanced Undergraduates and Graduates

ENG 301. GREEK AND ROMAN DRAMA IN TRANSLATION. (3) A study of selected plays of Aeschylus, Sophocles, Euripides, Aristophanes, Plautus, Terence

and Seneca with emphasis on dramaturgy and the development of the Greek and Roman theater.

ENG 305. EXPOSITORY WRITING. (3) The writing of essays, criticism and various forms of exposition.

ENG 306. INTRODUCTORY CREATIVE WRITING. (3) Writing of fiction, poetry or drama.

ENG 311. CHAUCER. (3) *The Canterbury Tales, Troilus and Criseyde,* and selected minor works.

ENG 321. THE EARLIER SEVENTEENTH CENTURY. (3) Major writers from Bacon and Donne to the Restoration.

ENG 331. HISTORY OF THE ENGLISH LANGUAGE. (3) Origins and development of the English language and its present usage.

ENG 333. LINGUISTICS AND LANGUAGE LEARNING. (3) Readings in, discussion of, and application of linguistically oriented theories of language acquisition directed towards gaining an understanding of language-learning processes and stages.

ENG 351. LITERARY CRITICISM THROUGH ARNOLD. (3) The major schools and critics.

ENG 400. ENGLISH COMPOSITION PRACTICUM. (1-3) With permission of the English Department may be repeated once for credit. Prerequisite: consent of the instructor. Through supervised tutorial experience and seminars, this course introduces the student to current developments concerning composition and to a variety of methods for teaching English composition. This course is highly recommended for those planning to teach or those currently engaged in teaching.

ENG 401. MODERN LITERARY CRITICISM. (3) Critical theories of the modern schools.

ENG 405. WRITING WORKSHOP. (3) Prerequisite: ENG 306 or the equivalent. May be repeated once for credit with the consent of the English Department.

ENG 406. ADVANCED EXPOSITORY WRITING. (3) Prerequisite: ENG 305. May be repeated once for credit with the permission of the English Department.

ENG 412. BRITISH LITERATURE FROM THE BEGINNINGS TO 1500. (3) A systematic survey of British literature from its beginnings to the end of the 15th century, excluding Chaucer. All the works studied in this course will be in translation into modern English.

ENG 413. BRITISH PROSE AND POETRY OF THE SIXTEENTH CENTURY. (3) The major works (excluding drama), More through Spenser, with attention to the development of the lyric.

ENG 421. THE BRITISH NOVEL BEFORE SCOTT. (3) Major writers and traditions, Defoe through Jane Austen.

ENG 422. THE BRITISH NOVEL, SCOTT THROUGH THE VICTORIANS. (3) Major writers and traditions through Hardy.

ENG 423. THE MODERN BRITISH NOVEL. (3) Representative British novels showing the philosophies and techniques affecting British fiction since Hardy.

ENG 424. MODERN IRISH LITERATURE. (3) The study of important developments in Irish literature between 1885 and the death of Yeats (1939).

ENG 431. BRITISH DRAMA TO 1600, EXCLUDING SHAKESPEARE. (3) A survey of the development of British drama to 1600, with representative plays from the Mystery-Miracle cycles, the Morality Plays and Tudor drama, including Lyly, Kyd, Marlowe, Peele, Greene and Dekker.

ENG 432. BRITISH DRAMA FROM 1600 TO 1642, EXCLUDING SHAKESPEARE. (3) A survey of Jacobean and Caroline drama including plays by Jonson, Beaumont and Fletcher, Webster, Middleton, Shirley, and Ford.

ENG 433. BRITISH DRAMA FROM 1660 TO 1780. (3) Representative plays of the Restoration and Eighteenth Century (Davenant to Sheridan), studied in connection with conditions in the theaters and pertinent dramatic criticism of the period.

ENG 441. COLONIAL AND EARLY AMERICAN LITERATURE. (3) American literature from Colonial times to Washington Irving.

ENG 445. LITERATURE OF THE AMERICAN SOUTH. (3) Selected works of Southern writers from Colonial times to the present.

ENG 450. CONTEMPORARY POETRY. (3) Poetry in English (including translations) since 1940.

ENG 451. MODERN DRAMA. (3) Representative Continental, British, and American plays from Shaw to the present.

ENG 452. MODERN EUROPEAN LITERATURE. (3) Study of selected modern European authors, translated into English, whose works have been of special interest to readers and writers of British and American literature.

ENG 453. CONTEMPORARY FICTION (3) Study of selected present-day fiction, with an emphasis upon works from outside the United States and Britain. Works not originally in English will be studied in translation into English.

ENG 455. PAN-AFRICAN LITERATURE. (3) An introduction to significant Pan-African literature, emphasizing the oral tradition, selected works of major authors in the Caribbean and Africa, and the relationships of these traditions to American, British and other literary traditions. Works not originally written in English will be studied in translation into English.

ENG 461. MODERN ENGLISH GRAMMAR. (3) Prerequisite: ENG 331, 332, or permission of the instructor. A descriptive analysis of the structure of Modern English, with emphasis upon the transformational approach.

ENG 465. LANGUAGE AND CULTURE. (3) Prerequisite: ENG 331 or ENG 332. Readings in and discussion and applications of the interrelationships between language and culture, including a basic introduction to the study of current American social and geographic dialects, with some attention to the study of pidgin and creole languages.

Courses for Graduate Students Only

ENG 601. BIBLIOGRAPHY AND METHODOLOGY. (3) An introduction to the scope, aims, materials and methods of literary scholarship, including criticism.

ENG 602. INTERPRETATIONS OF LITERATURE. (3) Demonstrations and practice in the various types of literary analysis, utilizing multi-media techniques where appropriate.

ENG 603. THE WORLDS OF JUVENILE LITERATURE. (3) Poetry, folk literature, modern fantasy, realism, and illustrations in books for young children and adolescents. An analysis of the literary qualities which distinguish the classic from the ephemeral through such critical approaches as the historical, the sociological, the psychological, and the archetypal.

ENG 611. SHAKESPEARE'S COMEDIES AND HISTORIES. (3) Detailed study of source materials, textual problems and stage conventions in selected comedies and history plays illustrating Shakespeare's dramaturgy.

ENG 612. SHAKESPEARE'S TRAGEDIES. (3) Source materials, textual problems and stage conventions of selected tragedies, chosen primarily from the period of the great tragedies, illustrating Shakespeare's dramaturgy.

ENG 613. MILTON. (3) The complete poetry and selections from the prose.

ENG 623. THE AUGUSTAN AGE. (3) The chief literary figures and conventions in the light of intellectual and historical currents.

ENG 625. THE ROMANTIC ERA, 1785-1832. (3) The development of the Romantic movement, with emphasis on the works of Wordsworth, Coleridge and other major poets.

ENG 626. THE VICTORIAN ERA, 1832-1900. (3) Emphasis on Tennyson, Robert Browning, Arnold, Carlyle, Ruskin, and Newman.

ENG 641. AMERICAN ROMANTICISM. (3) Major writers of the 1830's, 40's and 50's, including Hawthorne, Melville, Whitman, Emerson, Thoreau, and the Transcendental movement.

ENG 642. AMERICAN REALISM AND NATURALISM. (3) Major writers of the two movements before and after the end of the nineteenth century, including Twain, Howells, James, Crane, Dreiser and Norris.

ENG 643. AMERICAN MODERNISM. (3) Six to eight writers of the period since World War I, both prose and poetry.

ENG 647. PERSPECTIVES IN AFRO-AMERICAN LITERATURE. (3) A survey of Afro-American literature emphasizing the major authors, those relevant historical and social factors, and those specific literary movements which have influenced the development of Afro-American literature.

ENG 661. INTRODUCTION TO LINGUISTICS. (3) The science of linguistics, its techniques and objectives; descriptive and historical linguistics; language families of the world; language and society.

ENG 662. TOPICS IN RHETORIC. (3) Examination of and/or research concerning selected issues in rhetorical theory or pedagogy. (May be repeated for credit with English Department approval.)

ENG 680. SEMINAR IN BRITISH LITERATURE. (3)

ENG 685. SEMINAR IN AMERICAN LITERATURE. (3)

ENG 690. DIRECTED READING. (3)

ENG 695. INTERNSHIP IN COLLEGE TEACHING. (3) The teaching of one section in the UNCC English Department under supervision of the English staff. Students will be accepted for internship only upon the successful completion of all other degree requirements. The students will be assigned to teach selected basic courses, and will also participate in periodic conferences and seminars.

ENG 696. THESIS. (6) Appropriate research and written exposition of that research, which may or may not be outgrowth of work done in previous courses. If the thesis is the outgrowth of previous coursework, considerable additional research and exposition must be done beyond that previously undertaken. The proposed thesis work, as well as the final product, will be approved by a committee of three faculty appropriate to the topic, appointed by the Chairman of the department after consultation with the student, on the basis of a written proposal from the student. It is recommended that thesis work not be undertaken until near the end of progress toward the degree. The thesis title is to be shown on the student's final transcript. (A statement of recommendations and requirements for form and procedure is available in the English Department office.)

FOREIGN LANGUAGES

FRENCH

Chairman: Professor Suther

COURSE DESCRIPTIONS

Courses for Advanced Undergraduates and Graduates

FRE 331. FRENCH PHONETICS. (3) Prerequisite: FRE 202 or permission of the department. Study of the sounds of the French language, their production and their representation by means of the International Phonetic Alphabet. Practice in reading and speaking with proper rhythm and intonation.

FRE 403. FRENCH LITERATURE OF THE NINETEENTH CENTURY. (3) Prerequisites: FRE 303 and 304 or permission of the department. Concentration

on the sources of the 19th century literary ideas, the principal literary movements and the principal poets, dramatists, novelists and critics.

FRE 405. THE AGE OF ENLIGHTENMENT. (3) Prerequisites: FRE 303 or permission of the department. Major emphasis of "les philosophes," especially Montesquieu, Voltaire, Diderot and Rousseau.

FRE 408. THE SEVENTEENTH CENTURY. (3) Prerequisite: FRE 303 or permission of the department. Study of pre-Classical and Classical trends in 17th century French literature. Emphasis on the work of major writers of the period: Descartes, Pascal, Corneille, Moliere, Racine, LaFontaine.

FRE 450. SPECIAL TOPICS IN FRENCH. (3) Prerequisite: two 300 courses or permission of the instructor. Treatment in depth of a special subject group or figure in French language, literature or culture. May be repeated for credit with change of topic. Open for graduate credit with permission of the instructor.

GERMAN

COURSE DESCRIPTIONS

Courses for Advanced Undergraduates and Graduates

GER 403. SURVEY OF GERMAN LITERATURE I. (3) Prerequisite: two 300-level courses (not 360) or permission of the department. General introduction to German literature from the Middle Ages to the Classical Period. Book reports and class discussion on collateral readings.

GER 404. SURVEY OF GERMAN LITERATURE II. (3) Prerequisite: two 300-level courses (not 360) or permission of the department. German literature since classicism. Book reports and discussion on collateral readings.

GER 410. PERIODS IN THE HISTORY OF GERMAN LITERATURE: a) Medieval literature, b) Classicism, c) Romanticism, d) Contemporary literature. (3) Prerequisites: two 300-level courses (not 360) or permission of the department. Study of the major writers and works in a given period. Readings, lectures and reports. May be repeated for major credit as topic changes.

GER 420. THE CHIEF GENRES IN GERMAN LITERATURE: a) The novel, b) The drama, c) Lyric poetry. (3) Prerequisite: two 300-level courses (not 360) or permission of the department. An analysis of a major genre and its development within German literary history. Readings, lectures and reports. May be repeated for major credit as topic changes.

GER 450. SPECIAL TOPICS IN GERMAN. (1-2-3) Prerequisite: one 300-level course or permission of the instructor. Treatment of a special group or figure in German literature, specialized topic in German culture, or advanced work in German language. May be repeated for credit with change of topic.

COURSE DESCRIPTIONS

Courses for Advanced Undergraduates and Graduates

SPA 401. NINETEENTH CENTURY SPANISH LITERATURE. (3) Prerequisite: two 300-level courses or permission of the department. Survey of peninsular literature from Costumbrismo through the Generation of 1898. Lectures, discussions and reports on basis of extensive collateral reading. Course conducted in Spanish.

SPA 402. TWENTIETH-CENTURY SPANISH LITERATURE. (3) Prerequisite: two 300-level courses or permission of department. Treatment of major developments from the Generation of 1898 to the present day. Lectures, discussions and reports on the basis of extensive collateral readings. Course conducted in Spanish.

SPA 405. THE GOLDEN AGE OF SPANISH LITERATURE I. (3) Prerequisite: two 300-level courses or permission of department. *El Lazarillo* through *El Criticon*. Lecture, discussions and reports on basis of extensive collateral reading. Course conducted in Spanish.

SPA 406. THE GOLDEN AGE OF SPANISH LITERATURE II. (3) Prerequisite: two 300-level courses or permission of department. Study of works of the leading dramatists and poets of the period. Lectures, discussions and reports on basis of extensive collateral readings. Course conducted in Spanish.

SPA 411. STUDIES IN SPANISH AMERICAN PROSE FICTION. (3) Prerequisite: two 300-level courses or permission of the department. Studies of nineteenth and twentieth century Spanish American prose fiction. Course conducted in Spanish.

SPA 412. STUDIES IN SPANISH AMERICAN POETRY AND DRAMA. (3) Prerequisite: two 300-level courses or permission of the department. Studies in nineteenth and twentieth century Spanish American drama and/or poetry. Course conducted in Spanish.

SPA 413. DON QUIJOTE. (3) Prerequisite: two 300-level courses or permission of the department. Study of Cervantes' masterpiece, which is considered by many critics to be the basis of the modern Western novel. Course conducted in Spanish.

SPA 450. SELECTED READINGS IN SPANISH. (1-3) Prerequisite: two 300-level courses or permission of the department. Consideration of a predetermined author or literary movement. Course conducted in Spanish. May be repeated for credit.

Chairman: Professor Stuart

COURSE DESCRIPTIONS

Courses for Advanced Undergraduates and Graduates

Geography

GGY 301. GEOGRAPHY OF LATIN AMERICA. (3) A regional study of the basic human and physical differences from place to place which affect economic, social and political conditions of the Latin American countries.

GGY 302. GEOGRAPHY OF POLAR REGIONS. (3) A study of the Arctic and Antarctic regions with particular emphasis on the history of exploration, the physical environment and political significance.

GGY 303. GEOGRAPHY OF ANGLO AMERICA. (3) The geographic structure of the United States and Canada with emphasis on both the physical environment and the patterns of human activities.

GGY 304. THE SOUTH. (3) A study of the culture, environment, population, and economy of the southeastern U.S., with emphasis on current trends and their future implications.

GGY 305. GEOGRAPHY OF EUROPE. (3) A regional study of geographic conditions and their relationship to economic, social and political problems in Europe.

GGY 308. GEOGRAPHY OF EAST ASIA. (3) A regional study emphasizing the relationships that exist between the physical environment and the cultural patterns in geographic regions of China, Korea, Japan and the nations of Southeast Asia.

GGY 309. GEOGRAPHY OF SOUTH AND SOUTHWEST ASIA. (3) A regional study emphasizing the relationships that exist between the physical environment and the cultural patterns in geographic regions of the Indian subcontinent and the Arabian peninsula.

GGY 312. POPULATION GEOGRAPHY. (3) A study of spatial variations in the size, composition, distribution and growth of population. The causes and implications of geographic differences in fertility, mortality, and especially migration are discussed.

GGY 313. MANUFACTURING GEOGRAPHY. (3) A study of factors relating to the nature, locations and development of manufacturing industries. Emphasis upon classification of manufacturers, principal areas of manufacturing and other phases of economic geography.

GGY 316. RETAIL LOCATION. (3) A study of the spatial attributes of retailing and related activities. Emphasis upon location patterns, store location research, trade area delineation and consumer spatial behavior.

GGY 317. THE GEOGRAPHY OF TRANSPORTATION SYSTEMS. (3) The study of those geographical and human factors which affect the movement of

goods and people from place to place. Emphasis will be placed on transportation routes and networks, commodity flow patterns and the locational implications of freight rates.

GGY 318. AGRICULTURAL LOCATION. (3) A study of the functional and spatial attributes of agricultural and related activities. Emphasis upon economic factors which affect location patterns.

GGY 319. GEOGRAPHY OF INDUSTRIAL ACTIVITY. (3) The analytical study of the principles that affect the geographic distribution of manufacturing activity. Emphasis will be on theory, model building and the practical application of theory to geographic research. Also covered will be the role of industrial activity in regional development and planning. Although not required, students should generally plan to take GGY 313 first.

GGY 320. THE CITY AND ITS REGION. (3) A study of the regional system of cities in terms of their size, spacing, historical evolution, functional relationships, and future prospects.

GGY 321. INTERNAL STRUCTURE OF THE CITY. (3) An integrative study of the spatial structure of cities with emphasis on land use patterns and models, transportation systems, residential concentrations, commercial activities and manufacturing zones.

GGY 323. BEHAVIORAL GEOGRAPHY. (3) A study of various information processing and decision making models that affect locational choices. The primary emphasis is on the application of these models to the analysis of environmental preferences, human behavior in natural hazard zones, urban social and economic locational behavior and landuse planning.

GGY 324. WORLD FOOD PROBLEMS. (3) A study of the magnitude, consequences, major causes, and potential solutions to the world's food problems.

GGY 331. AIR PHOTO INTERPRETATION. (3) Procedures and practice in the recognition, measurement, and analysis of features on aerial photographs and satellite imagery. One hour of lecture and two two-hour labs per week.

GGY 332. ADVANCED CARTOGRAPHY. (3) Prerequisite: GGY 202. Preparation of maps, figures and charts at a professional level of competence. Techniques to be emphasized include scribing and various related photographic processes in addition to conventional pen and ink methods. Two laboratories of three hours each week.

GGY 340. LAND USE PLANNING. (3) An examination of land use planning, with emphasis on basic planning processes, implementation techniques and strategies, and issues confronting contemporary urban and rural planning.

GGY 341. RESOURCE PLANNING. (3) A study of the resources of the world, especially as they pertain to population, their use and misuses and present conservational practices as they relate to planning for future resource adequacy.

GGY 342. THE REGION AND PLANNING. (3) Prerequisite: GGY 340 or consent of the instructor. The regional concept and its application to urban and regional planning. Emphasis to be upon the techniques used in regional analysis.

GGY 343. ENVIRONMENTAL PLANNING. (3) An examination of the interaction and relationships between natural and manmade elements of the environment. Emphasis will be placed on planning concepts and methodologies used in contemporary environmental planning.

GGY 350. ADVANCED GEOGRAPHIC ANALYSIS. (3) Prerequisite: GGY 203 or consent of instructor. An examination of advanced analytical methods in geography. The course will include multi-variate analysis and complex spatial models. Course will include computer usage.

GGY 402. SELECTED TOPICS IN GEOGRAPHY. (3) Prerequisite: consent of instructor. An intensive study of topics in geography. Topics will be offered from such areas as urban, manufacturing, tertiary activity, transportation, primary activity and political geography. Topics will vary from semester to semester. May be repeated for credit.

GGY 450. INDIVIDUAL STUDY IN GEOGRAPHY. (1-4) Permission of the department must be obtained and credit hours established in advance. May be repeated for credit. Tutorial study or special research problems.

Earth Science

ES 300. THE VIOLENT EARTH. (3) A study of past and present catastrophic natural phenomena which literally change the face of the earth and man's adjustments to these events. Topics include: continental drift, ice ages, volcanoes, earthquakes, climatic change, hurricanes, tornadoes, and floods.

ES 301. THE ENVIRONMENTAL DILEMMA. (3) An examination of the nature, causes and responses to major environmental problems.

ES 310. STRATIGRAPHY AND EARTH HISTORY. (3) Prerequisite: ES 102. Changes in the earth's environments and life forms through geologic time as determined by a study of stratigraphic principles and their application to fossil organisms and sedimentary rocks. Three lecture hours per week, occasional lab and field work.

ES 330. BIOGEOGRAPHY. (3) An introduction to the biosphere with focus on structure, processes and patterns. Three hours per week with occasional field work integrated into course.

ES 335. SOIL SCIENCE. (3) Prerequisite: ES 102. Corequisite: CHE 101 or consent of the instructor. Presentation and application of knowledge of soil forming processes to the management and use of soils. Two hours of lecture, three hours of lab per week with occasional field trips.

ES 340. FIELD METHODS IN THE EARTH SCIENCES. (4) Prerequisite: ES 101 and ES 102 or consent of the instructor. Introduction to field techniques used in studies of geology, topography, hydrology, soil, microclimate and vegetation.

Writing skills related to the presentation of scientific data are emphasized. Three hours of lecture and one two-hour lab per week. Earth Science majors should take ES 340 as soon as possible after completion of ES 101 and ES 102.

ES 341. NATURAL ENVIRONMENTS OF NORTH AMERICA. (3) A study of the physiographic regions of the United States, the genesis and pattern of the major landforms included within each, their distinctive characteristics and their cartographic interpretation.

ES 342. METEOROLOGY. (3) An introduction to atmospheric phenomena, weather producing processes, weather forecasting and weather effects upon man's activities.

ES 343. WEATHER ANALYSIS LABORATORY. (1) Prerequisite or corequisite: ES 342 or consent of instructor. An introduction to weather observation and techniques of weather forecasting. One two-hour lab per week.

ES 345. MICROCLIMATOLOGY. (3) Prerequisites: ES 101, introductory physics, or consent of instructor. An examination of the fundamental energy exchanges which determine local-scale climates and manmade modifications of these environments. Topics include micrometeorological factors associated with building and urban climates, human comfort, plant energy and moisture environments, and air pollution dispersion.

ES 348. APPLIED CLIMATOLOGY. (3) Prerequisite: ES 101 and GGY 203 or Statistics, or consent of instructor. Methods of acquiring and analyzing climatic data in various types of applied problems. Emphasis on methods to assess and reduce the economic impacts of weather effects upon man's activities.

ES 350. MINERALS AND ROCKS. (4) Prerequisite or corequisite: ES 102. Formation processes, composition and identification of rocks and minerals in the earth's crusts with important abundance or special use. Three lectures and one lab two hours per week.

ES 351. MINERALOGY. (4) Prerequisite: ES 102, Corequisite CHE 101 or consent of the instructor. Identification, classification and description of minerals based on crystallography and chemical composition. Includes physical properties and diagnostic techniques for identification of common ore and rock forming minerals. Three hours of lecture and two hours of lab per week.

ES 352. PETROLOGY. (4) Prerequisite: ES 350 or ES 351. Introduction to rock specimen identification and classification. Includes processes leading to igneous, sedimentary and metamorphic rock formation and field associations. Three hours of lecture and two hours of lab per week.

ES 353. SEDIMENTARY PROCESSES. (4) Prerequisite: ES 102. Pre- or corequisite: ES 350 or ES 351 or consent of the instructor. Origin, dispersion, deposition, diagenesis, classification and general distribution of sedimentary materials, principles of physical stratigraphy and biostratigraphy. Three hours of lecture and one three-hour lab per week.

ES 354. GEOLOGY OF THE SOUTHEASTERN UNITED STATES. (3) Prerequisites: ES 350 or ES 352, or consent of instructor. An examination by geologic provinces—rocks, minerals and fossils present; structural relationships; historical framework and economic potential. The evolution of the geologic provinces in terms of plate tectonics. Three hours of lecture per week coupled with occasional field trips.

ES 355. GEOLOGIC MAPPING AND INTERPRETATION. (4) Prerequisites: ES 350 or ES 352, and ES 360, or consent of instructor. A combined field and lab oriented study using principles of mineralogy, petrology and structural geology. Involves collection and resolution of field data, techniques of presenting data, development of geologic maps, and critical reviews of existing literature. Two hours of lecture, four hours of lab/field work per week.

ES 360. STRUCTURAL GEOLOGY. (4) Prerequisite: ES 340 or consent of the instructor. A study of the processes of the folding and fracturing of rock. The identification, description and relationships of these and other geologic features. Labs include techniques for solving three dimensional geologic problems based on field data. Three hours of lecture, two hours of lab per week.

ES 361. LANDSCAPE EVOLUTION. (4) Prerequisite: ES 102. Treatment of the processes shaping the earth's surface, genesis of landforms and the theories related to landform development. Three lecture hours and one laboratory period of two hours a week.

ES 362. FLUVIAL PROCESSES. (4) A hydrologic and geomorphic study of the transport of water and earth materials within stream systems. Erosion, mass wasting, open channel flow, sediment transport, flooding, stream channel morphology, morphometry of drainage basins, and related topics will be stressed.

ES 365. PHYSICAL AND GEOLOGICAL OCEANOGRAPHY. (3) Prerequisite: one year of a natural science recommended. A study of the principles of oceanography with emphasis on world-ocean environment, and the interrelationships of its waters and its earthly and atmospheric boundaries. Includes seawater composition, oceanic circulation, perturbations of the sea surface and geology of the ocean basins.

ES 366. OCEANOGRAPHIC ANALYSIS LAB. (1) Corequisite: ES 365. An introduction to laboratory methods in physical and geological oceanography, concentrating on techniques of data acquisition, analysis, and interpretation. One two-hour lab per week and occasional field work.

ES 367. HYDROLOGIC PROCESSES. (4) Prerequisite: ES 101 or 102, or consent of the instructor. An introduction to the atmospheric, soils, and geologic aspects of surface and ground processes. Three lecture hours and one two-hour lab per week.

ES 371. ENVIRONMENTAL QUALITY MANAGEMENT. (3) A study of concepts and techniques used in the design and implementation of air and water resource management plans.

ES 372. ENVIRONMENTAL IMPACT ANALYSIS. (3) Prerequisite: 15 hours of earth sciences, including ES 340. A survey of environmental impact requirements and associated procedures, guidelines and methods of assessing physical environmental impacts. Three hours per week of combined lecture and supervised field work.

ES 385. ENVIRONMENTAL GEOCHEMISTRY. (4) Prerequisite: ES 102 and CHEM 101 or 102, or consent of instructor. Geochemical factors relating to man and the environment including chemistry of the biosphere, lithosphere, hydrosphere and atmosphere, geochemical cycles and the chemical effect of man on his ecosystem. Three lecture and one two-hour lab per week.

ES 404. CONCEPT DEVELOPMENT IN EARTH SCIENCE. (3) Prerequisite: consent of the instructor. Examination of major concepts in earth science with emphasis on implementing their instruction at the primary and secondary school levels. One lecture hour and two laboratory periods of two hours each week.

ES 405. SELECTED TOPICS IN EARTH SCIENCES. (1-4) Prerequisite: consent of instructor. An in-depth treatment of specific topics selected from one of the fields of the earth sciences. Topics will vary from semester to semester. May be repeated for credit.

ES 410. APPLIED GEOPHYSICS. (4) Prerequisites: ES 350 or 352, 353 or 335, and 360. Prerequisite or corequisite: introductory physics or consent of the instructor. Instrumental analysis of the earth's physical parameters. Study of man-induced seismic and electrical signals, and natural magnetic and gravitational fields for the purposes of locating faults, ore bodies, ground water and other earth hazards or resources. Three one-hour lectures and one two-hour lab per week.

ES 415. SITE ANALYSIS. (4) Prerequisites: ES 350 or 352, 353 or 335, 360 and introductory physics or consent of instructor. Earth science methods used in the intensive study of limited field areas, such as power plant sites, pipe line, tunnel or dam sites, mining locations, or any confined site where earth processes will affect human activity. Includes one two-hour lab.

ES 460. INDIVIDUAL STUDY IN EARTH SCIENCES. (1-4) Permission of the department must be obtained and credit hours established in advance. Tutorial study or special research problems. May be repeated for credit.

Courses for Graduate Students Only

GGY 601. TOPICS IN ECONOMIC GEOGRAPHY. (3) Major topics in the location of economic activity examined generally and in a specific local occurrence. May be repeated for credit.

GGY 602. TOPICS IN URBAN GEOGRAPHY. (3) Major topics in the form and structure of urban areas examined generally and in a specific local ocurrence. May be repeated for credit.

GGY 603. TOPICS IN POLITICAL GEOGRAPHY. (3) Major topics in spatial aspects of political systems with special emphasis on urban and regional spatial

patterns examined generally and in a specific local occurrence. May be repeated for credit.

GGY 604. TOPICS IN REGIONAL GEOGRAPHY. (3) Intensive examination of major spatial questions in a given region. May be repeated for credit.

GGY 605. TOPICS IN ENVIRONMENTAL STUDIES. (3) Major topics concerning the physical environment with emphasis on pollution problems in urban areas examined generally and in a specific local occurrence. May be repeated for credit.

GGY 606. TOPICS IN PHYSICAL GEOGRAPHY. (3) Major topics in physical geography examined generally and in specific local occurrence. May be repeated for credit.

GGY 615. QUANTITATIVE ANALYSIS IN GEOGRAPHY. (3) A study of statistical and other quantitative techniques commonly used in geographic research. A knowledge of elementary statistics is assumed.

GGY 616. CARTOGRAPHIC PREPARATION AND ANALYSIS. (3) Cartographic design and analysis of qualitative and quantitative data. Emphasis to be on the preparation of maps, figures and charts. Techniques include scribing and various photographic processes. Two three-hour labs each week.

GGY 617. RESEARCH DESIGN FUNDAMENTALS. (3) Prerequisite: consent of the instructor. An introduction to scientific research and problem solving. Topics include problem identification, bibliographic search, data sources and collection, techniques selection and preparation of reports and proposals. The student will be required to formulate a substantive research problem.

GGY 618. ANALYSIS AND PRESENTATION OF RESEARCH DATA. (3) Prerequisite: GGY 617. The student is required to complete a research project. In addition, topics such as research critiques, preparation and presentation of research reports, and the development of geographic thought are considered.

GGY 650. SEMINAR IN GEOGRAPHY. (3) Study of the current trends in geographic thought and research methods, *Pass/No Credit* grading.

GGY 651. TOPICS IN GEOGRAPHIC TECHNIQUES. (3) Detailed study of cartographic, remote sensing, quantitative techniques or field techniques. May be repeated for credit.

GGY 680. DIRECTED PROBLEMS IN GEOGRAPHY. (3) Individual research into geographic topics. May be repeated one time.

GGY 690-691. INDIVIDUAL RESEARCH PROJECT. (3,3) Individual research report based on directed study of a topic of geographic significance. *Pass/No Credit* grading.

Earth Sciences

ES 650. WORKSHOP IN GEOGRAPHY. (4) a. Earth Science I. A series of lectures on the subject matter of the atmosphere and hydrosphere with accompanying laboratory sessions.

ES 651. WORKSHOPS IN GEOLOGY. (4) a. Earth Science II. A series of lectures on subject matter of the lithosphere and space science with accompanying laboratory sessions.

ES 660. EARTH SCIENCES FIELD INVESTIGATIONS. (1-6) Prerequisite: consent of instructor. A concentrated field investigation of selected earth sciences topics. Course subject matter, credit hours, location, and duration will be specified each time course is offered. May be repeated for credit, *Pass/No Credit* grading.

HISTORY

Chairman: To Be Announced

COURSE DESCRIPTIONS

Courses for Advanced Undergraduates and Graduates

HIS 411. PROBLEMS IN HISTORY. (3) A colloquium designed around a problem in history, utilizing reading, discussion, reports and short papers. Topics vary within the fields of American, European, Latin American, African and Asian history. May be repeated for credit.

HIS 416. RECENT UNITED STATES RADICALISM. (3) Radical thought and action in the United States since 1890. Emphasis on Marxian-Socialism, Black and labor radicalism, radical women and the New Left movement.

HIS 491. HISTORY INTERNSHIP. (1-3) Applied historical techniques utilizing modern methodology and experiences in off-campus institutions, or on historical sites. May be repeated for credit for a maximum of six hours.

HIS 492. SEMINAR IN HISTORY. (3) Prerequisite: consent of the department. An intensive examination of a subject in history. May be repeated for credit.

Courses for Graduate Students Only

HIS 601. DIRECTED READINGS/RESEARCH. (3) Prerequisite: prior written consent of instructor and graduate coordinator. Graduate students will meet individually or in small groups with the instructor and will be assigned readings and/or research on a theme which relates to the lectures of an undergraduate class. Attendance at the lectures is a course requirement, but evaluation and credit will be based on directed readings/research and conferences or small group discussion. May be repeated for credit.

HIS 602. CURRICULUM MATERIALS IN HISTORY. (3) Prerequisite: prior written consent of instructor and graduate coordinator. May be repeated for credit. Graduate students will meet individually or in small groups with the instructor and will develop syllabi, lesson plans, bibliographies, and instructional materials on a theme which relates to the lectures of an undergraduate class. Attendance at the lectures is a course requirement, but evaluation and credit will be based on the curriculum materials developed and on conference or small group discussion.

HIS 650. TOPICS IN HISTORY. (3) Intensive treatment of a period of broader survey of a topic, depending on student needs and staff resources. May be repeated for credit.

HIS 693. HISTORIOGRAPHY AND METHODOLOGY. (3) A study of the historian and his philosophical and methodological approach. Required of all M.A. candidates.

HIS 694. READINGS IN HISTORY. (3) Prerequisite: prior written consent of instructor. Coverage of historical periods or topics through individually designed reading programs; scheduled conferences with a staff member. May be repeated for credit.

HIS 696. GRADUATE COLLOQUIUM. (3) A colloquium focused on a theme or period. Assigned readings, short papers and reports directed toward developing research and writing skills. May be repeated for credit.

HIS 697. DIRECTED RESEARCH. (3) Prerequisite: prior written consent of instructor. Investigation of a historical problem culminating in a research paper. May be repeated for credit.

HIS 699. THESIS. (3 or 6) May be repeated by permission, if taken for three hours credit. Six hours of Thesis may be taken during a single semester. Appropriate research and written exposition of that research is required. If the thesis is the outgrowth of previous course work, considerable additional research and writing must be attempted.

MATHEMATICS

Chairman: Professor Schell

COURSE DESCRIPTION

Advanced Undergraduate Courses Available for Graduate Credit in the M.H.D.L. Program

Course Numbering for Master of Arts in Education in Mathematics Courses

The first digit of each course number indicates the year in which the course is normally taken. The middle digit of each course number indicates the lowest grade level and certificate served, according to the following scheme:

Middle Digit	*Lowest Grade Level Served*	*Certificate*
0	0	K-3
4	4	Intermediate
7	7	Secondary

These courses are primarily for students seeking teacher certification, certificate renewal, certificate upgrading, or for students in the MHDL program. None of these courses may be applied to a major in mathematics (but may be accepted as non-math electives for the B.A., B.S., or M.A. Ed. degrees).

Approval of Individual Program

Approval of the program of each student and advice regarding his progress toward the degree will be the responsibility of an adviser appointed at the time of his admission to the Department of Mathematics.

Examination

Each student must pass a comprehensive examination (including an oral examination) on overall work presented for the degree.

MAE 500. TOPICS IN MATHEMATICS EDUCATION, EARLY CHILDHOOD. (1-6) Consent of the department.

MAE 501. ARITHMETIC IN THE SCHOOL. (3) Prerequisite: MAT 101 or equivalent. A study of the number systems with emphasis placed upon the basic concepts and meanings, properties of addition, multiplication, inverses, systems of numeration, and number line appropriate for each grade. (Does not count toward a major in mathematics. Open only to transfer students who have completed six semester hours of mathematics at another university.)

MAE 505. GEOMETRY FOR TEACHERS. (3) Prerequisite: MAE 202 or MAE 501 or consent of the department. A study of the foundations of Euclidean geometry and a brief treatment of non-Euclidian geometry. Emphasis on learning activities and teaching techniques for teachers of mathematics K-12.

MAE 540. TOPICS IN MATHEMATICS EDUCATION, INTERMEDIATE. (1-6) Consent of the department.

MAE 541. MATHEMATICS FOR THE INTERMEDIATE SCHOOL TEACHER. (3) Prerequisites: MAE 202 or consent of the department. A study of the algebraic properties or the real numbers; functions, equations, inequalities, and their graphs; activities and applications related to upper elementary and intermediate grades.

MAE 570. TOPICS IN MATHEMATICS EDUCATION, SECONDARY. (1-6) Consent of the department.

MAE 571. MATHEMATICS FOR THE SECONDARY SCHOOL TEACHER. (3) Prerequisites: MAE 202 or mathematics major with declared option for Secondary School Certification, or consent of the department. A study of secondary school mathematics and its relation to the curriculum K-12. Strategies, techniques, and activities in teaching mathematics.

Advanced Undergraduate Courses Available for Graduate Credit in the M.H.D.L. or M.A. Ed. Program

MAT 300. TOPICS IN FOUNDATIONS OR HISTORY OF MATHEMATICS. (2-3) Prerequisite: consent of the department. Topics in the foundations or the history of mathematics selected so as to supplement regular course offerings in this area of mathematics. Topics may be proposed by students and/or faculty and must be approved by the department. (May be repeated for additional credit with the approval of the department.)

MAT 310. TOPICS IN DECISION MATHEMATICS. (2-3) Prerequisite: consent of the department. Topics in decision mathematics selected so as to supplement regular course offerings in this area of mathematics. Topics may be proposed by students and/or faculty and must be approved by the department. (May be repeated for additional credit with the approval of the department.)

MAT 312. OPERATIONS RESEARCH II. (3) Prerequisite: MAT 311. A continuation of MAT 311.

MAT 320. TOPICS IN PROBABILITY AND STATISTICS. (2-3) Prerequisite: consent of the department. Topics in probability and statistics selected so as to supplement regular course offerings in this area of mathematics. Topics may be proposed by students and/or faculty and must be approved by the department. (May be repeated for additional credit with the approval of the department.)

MAT 322. PROBABILITY AND STATISTICS I. (3) Prerequisite: MAT 241 with a grade of *C* or better. Continuous and discrete sample spaces, continuous and discrete random variables, moments and moment generating function, functions of random variables, some standard distributions, multivariate variables, laws of large numbers, limit theorems, stochastic processes.

MAT 323. PROBABILITY AND STATISTICS II. (3) Prerequisite: MAT 322. Estimation, bias, consistency, efficiency, method of moments, maximum likelihood estimates, sufficient statistics, testing hypothesis, simple hypothesis, most powerful test, composite hypothesis, the power function, uniformly most powerful test, sequential tests, the sequential likelihood ratio test, some one sample problem, the classical chi-square test, the Kolmogorov-Smirnov test.

MAT 340. TOPICS IN ANALYSIS. (2-3) Prerequisite: consent of the department. Topics in analysis selected so as to supplement regular course offerings in this area of mathematics. Topics may be proposed by students and/or faculty and must be approved by the department. (May be repeated for additional credit with the approval of the department.)

MAT 341. ADVANCED CALCULUS OF ONE VARIABLE. (3) Prerequisites: MAT 241 and junior standing. Least upper bound principle; sequences; sequences of functions; topology of the real line; continuity and uniform continuity of functions; differential calculus; Riemann integration.

MAT 346. INTRODUCTION TO COMPLEX ANALYSIS. (3) Prerequisite: MAT 241 with a grade of *C* or better. Analytic function theory; complex integration; sequences; series; residue calculus and conformal mapping.

MAT 360. TOPICS IN ALGEBRA. (2-3) Prerequisite: consent of the department. Topics in algebra selected so as to supplement regular course offerings in this area of mathematics. Topics may be proposed by students and/or faculty and must be approved by the department. (May be repeated for additional credit with the approval of the department.)

MAT 370. TOPICS IN APPLIED MATHEMATICS. (2-3) Prerequisite: consent of the department. Topics in applied mathematics selected so as to supplement regular course offerings in this area of mathematics. Topics may be proposed by students and/or faculty and must be approved by the department. (May be repeated for additional credit with the approval of the department.)

MAT 376. NUMERICAL ANALYSIS. (3) Prerequisites: Computer Science 100, MAT 241 and 271. A treatment of the numerical solution of initial value and

boundary value problems in ordinary differential equations. An introduction to the numerical solution of partial differential equations. Direct and iterative methods of solving systems of equations will be developed. Selected problems will be programmed for computer solution.

MAT 380. TOPICS IN GEOMETRY-TOPOLOGY. (2-3) Prerequisite: consent of the department. Topics in geometry and/or topology selected so as to supplement regular course offerings in this area of mathematics. Topics may be proposed by students and/or faculty and must be approved by the department. (May be repeated for additional credit with the approval of the department.)

MAT 381. FUNDAMENTAL CONCEPTS OF GEOMETRY. (3) Prerequisites: MAT 264 and consent of the department. Foundations of geometry, affine geometry, comparison of Euclidean and non-Euclidean geometries.

MAT 383. INTUITIVE TOPOLOGY. (3) Prerequisite: MAT 241. Introduction to combinatorial topology, topology of E^n; winding number and applications; homotopies and the fundamental group.

MAT 391. SEMINAR. (1-6) Prerequisite: consent of the department. Readings, study and discussion designed to develop the student's ability to study independently and to present his results properly.

MAT 392. SEMINAR. (1-6) Prerequisite: consent of the department. A continuation of MAT 391.

MAT 409. HISTORY OF MATHEMATICAL THOUGHT. (3) Prerequisite: consent of the department. A study of the development of mathematics in its historical setting from the earliest beginnings to modern times.

MAT 450. SELECTED TOPICS IN MATHEMATICS. (2-3) Prerequisite: consent of the department. Topics chosen from such fields as topology, differential geometry, complex analysis, applied mathematics or modern algebra. May be repeated for credit with the approval of the department.

MAT 491. SEMINAR. (1-6) Prerequisite: consent of the department. Individual investigation and appropriate exposition of the results.

MAT 492. SEMINAR. (1-6) Prerequisite: consent of the department. A continuation of MAT 491.

MAT 522. STATISTICAL TECHNIQUES. (3) Prerequisite: consent of the department. (Credit toward mathematics major given only to teacher education students.) Probability models, random variables, large sample statistics, inferential statistics. (Credit toward mathematics major not given for both MAT 522 and MAT 322.)

Advanced Undergraduate Courses Available for Graduate Credit in the M.H.D.L., M.A. Ed. or M.A. Programs

MAT 323. PROBABILITY STATISTICS II. (3) Prerequisite: MAT 322. Estimation, bias, consistency, efficiency, method of moments, maximum likelihood esti-

mates, sufficient statistics, testing hypothesis, simple hypothesis, most powerful test, sequential tests, the sequential likelihood ratio test, some one sample problem, the classical chi-square test, the Kolmogorov-Smirnov test.

MAT 443. ANALYSIS I. (3) Prerequisite: MAT 341 with a grade of *C* or better. An introduction to metric spaces, including properties of subsets, continuity of functions, pointwise and uniform convergence of sequences of functions.

MAT 444. ANALYSIS II. (3) Prerequisite: MAT 443. An introduction to Lebesque integration and measure theory, starting with a construction of measure for closed and bounded intervals of R and extending to an axiomatic treatment of a general measure on abstract spaces.

MAT 463. MODERN ALGEBRA I. (3) Prerequisites: MAT 263 and consent of the department. The first course of a two-semester sequence covering topics in group theory, rings and ideals, fields and Galois theory.

MAT 464. MODERN ALGEBRA II. (3) Prerequisite: MAT 463. A continuation of MAT 463.

MAT 465. NUMERICAL LINEAR ALGEBRA. (3) Prerequisite: CSC 100, MAT 264, 271. Direct methods of solving linear systems by Gaussian elimination and triangular decomposition. Matrix and vector norms, condition numbers and accuracy of solutions. Methods for solving the algebraic eigen-value problem; the power and inverse power methods, reduction to upper Hessenberg form and the QR algorithm. Iterative methods for solving large sparse matrix systems; Jacobi, Gauss-Seidel and successive overrelaxation (SOR) methods. Selected problems will be programmed for computer solution.

MAT 481. INTRODUCTION TO TOPOLOGY. (3) Prerequisite: MAT 341 or 383. Topics from set theory and point set topology such as cardinality, order, topological spaces, metric spaces, separation axiom, compactness and connectedness.

CSC 431. COMPUTER SIMULATION. (3) Prerequisite: CSC 100, MAT 322, junior standing and consent of the department. A study of simulation as a tool of computer science or applied mathematics. Introduction of a simulation language such as DYNAMO or GASP and simulation methodology. Topics will include the design of simulation models, discrete and continuous systems and optimization techniques. Selected applications will also be covered.

Courses for Graduate Students Only

MAT 600. FOUNDATIONS OF MATHEMATICS. (3) Prerequisite: consent of the department. Sets, logic and axiomatics with examples drawn from algebra and geometry.

MAT 601. THE NUMBER SYSTEM. (3) Prerequisite: MAT 600 or consent of the department. An axiomatic development of the number system from the natural numbers to the complex numbers.

MAT 603. COMPUTER TECHNIQUES AND NUMERICAL METHODS. (3) Prerequisite: MAT 601 or consent of the department. A study of digital computer systems, the programming of a digital computer and the use of the computer in the solution of problems by numerical methods.

MAT 604. TOPICS IN ANALYSIS. (3) Prerequisite: MAT 601 or consent of the department. A selection of topics forming an axiomatic and rigorous study of analysis including topics such as linear and affine transformation from E to E, differentiation of functions from E to E, integration theory and introduction to abstract spaces. May be repeated for credit.

MAT 606. MODERN ALGEBRA. (3) Prerequisite: consent of the department. Topics include groups, finitely generated abelian groups, homomorphisms, Sylow theory, rings and ideals, integral domains, fields, and polynomials over commutative rings and fields.

MAT 607. LINEAR ALGEBRA. (3) Prerequisite: consent of the department. Topics include systems of linear equations, and matrices, vector spaces, linear transformations, determinants, canonical forms of matrices, inner product spaces.

MAT 608. TOPICS IN GEOMETRY-TOPOLOGY. (3) Prerequisite: MAT 601 or consent of the department. A study of selected topics from geometry and topology such as: Euclidean geometry, Non-Euclidean geometry, projective geometry, differential geometry, point-set topology, algebraic topology. May be repeated for credit.

MAT 609. SEMINAR. (1,2 or 3) Prerequisite: admission to candidacy for M.A. Ed. A series of regularly scheduled meetings in which each student will present one or more topics selected by the seminar coordinator. May be repeated for credit.

MAT 721. STATISTICS. (3) Prerequisites: MAT 264, 322, 323, 341. A survey course intended to acquaint the student with frequently used statistical techniques. Topics will be selected from: general discussion of estimation theory and hypothesis testing; comparison of parametric and nonparametric techniques in the one and two sample location and dispersion problems; goodness of fit criterion and tests for independence; measures of association; regression techniques; multisample inferential techniques, parametric and nonparametric.

MAT 741. COMPLEX ANALYSIS I. (3) Prerequiste: MAT 346 and MAT 443. A study of hormomorphic functions, complex integration, calculus of residues, representation theorems including the Laurent and Mittag-Leffler theorems, analytic continuation, elliptic functions, entire and meromorphic functions, normal families and conformal mapping.

MAT 742. COMPLEX ANALYSIS II. (3) Prerequisite: MAT 741. A continuation of MAT 741.

MAT 743. REAL ANALYSIS I. (3) Prerequisite: MAT 444. A study of integration and measure theory, including such topics as Lebesque-Stieltjes integrals, L_p-spaces, the Haar integral, the Riesz-Markov representation theorem and the Radon-Nikodym theorem.

MAT 744. REAL ANALYSIS II. (3) Prerequisite: MAT 743. A continuation of MAT 743.

MAT 761. LINEAR ALGEBRA. (3) Prerequisite: consent of the department. A study of the structure of abstract linear spaces, dual bases, quotient spaces, tensor products, and product spaces. A study of linear transformation, including projections, quotient transformations, and tensor products of transformations. A study of inner products and normed linear spaces, with a brief mention of examples such as Banach and Hilbert spaces.

MAT 763. MODERN ALGEBRA I. (3) Prerequisite: MAT 464. A study of the structure of groups, rings and modules. Topics will be selected from: groups with operators, normal series, Jordan-Hölder theorem, products, co-products, and Sylow theorems. Module topics selected from: free modules, projective and injective modules, exact sequences, tensor product, exterior algebra, dual modules, and modules over principal ideal domains.

MAT 764. MODERN ALGEBRA II. (3) Prerequisite: MAT 763. The structure of fields and commutative rings. Topics will be selected from: transcendental and algebraic field extensions, Galois theory for finite and infinite field extensions. Ring topics selected from: localization of commutative rings, Noetherian rings, primary decomposition, Dedekind domains, and discrete valuations.

MAT 771. METHODS OF APPLIED MATHEMATICS. (3) Prerequisites: MAT 271, 371. A selection of topics involving applications of analysis such as variational methods in optimization, linear integral equations, vibration and eigen-value problems, and asymptotic expansions.

MAT 776. ADVANCED NUMERICAL ANALYSIS. (3) Prerequisites: MAT 264, 271, 465. A selection of topics from such areas as iterative methods of solving linear and nonlinear systems of equations, approximation theory, splines and finite elements, and finite differences and finite element methods of solving partial differential equations.

MAT 781. TOPOLOGY I. (3) Prerequisite: consent of the department. A study of topological spaces and continuity. Concepts treated will include connectedness, compactness, and metrizability, and may include further topics in the various branches of topology, i.e., point-set topology, geometric topology and algebraic topology.

MAT 782. TOPOLOGY II. (3) Prerequisite: MAT 781. A continuation of MAT 781.

MAT 791. RESEARCH SEMINAR. (3) Prerequisite: consent of the department. A seminar in which independent study may be pursued by the student under the direction of a professor or in which special topics may be studied by a group of students under the direction of a professor.

MAT 792. RESEARCH SEMINAR. (3) Prerequisite: consent of the department. A continuation of MAT 791.

Chairman: Associate Professor Oberhofer

COURSE DESCRIPTIONS

Courses for Advanced Undergraduates and Graduates

PHY 321. CLASSICAL MECHANICS I. (3) Prerequisites: PHY 221; MAT 241 and 271. The first course of a two-semester sequence treating particle dynamics, the motion of systems of particles, rigid body motion, moving coordinate systems, Lagrange's equations, Hamilton's equations and small oscillations. Three lecture hours a week.

PHY 331. ELECTROMAGNETIC THEORY I. (3) Prerequisites: PHY 231: MAT 241 and 271. The first course of a two-semester sequence. Topics considered include electrostatics and magnetostatics in free space and in matter, the motion of charged particles in electric and magnetic fields, capacitance, dielectric theory, field energy, electromagnetic induction and inductance, vector and scalar potentials, magnetic properties of matter, Maxwell's equations, solutions of Maxwell's equations in free space and in matter, propagating electromagnetic waves and boundary value problems. Three lecture hours a week.

PHY 341. QUANTUM PHYSICS I. (3) Prerequisites: PHY 231 and 241, MAT 241 and 271, or consent of the department. Empirical necessity for quantum physics. Postulates of quantum physics. Analytical study of quantum physics of the atom. Three lecture hours a week.

PHY 345. STATISTICAL PHYSICS. (3) Prerequisite: PHY 231 and 241 or consent of the department. Introduction to the microscopic foundations for macroscopic systems. Kinetic theory and introductory statistical mechanics. Three lecture hours a week.

PHY 411. NUCLEAR PHYSICS. (3) Prerequisites: PHY 231 and 241 and MAT 271. A study of the nucleus, radioactivity, nuclear reactions, fission, fusion, interactions of radiation with matter and measurement of radiation. Three hours lecture per week.

PHY 421. CLASSICAL MECHANICS II. (3) Prerequisite: PHY 321. Continuation of PHY 321. Three lecture hours a week.

PHY 431. ELECTROMAGNETIC THEORY II. (3) Prerequisite: PHY 331. Continuation of PHY 331. Three lecture hours a week.

PHY 441. QUANTUM PHYSICS II. (3) Prerequisite: PHY 341. Continuation of PHY 341 with selected applications from atomic, molecular, solid state and nuclear physics. Three lecture hours a week.

PHY 451. INVESTIGATIONS. (1-4) Prerequisite: junior standing and consent of department. An independent investigation by the student on an appropriate topic. Both a written and an oral presentation of the results of the investigation will be required.

PHY 495. SELECTED TOPICS IN PHYSICS. (0-4) Prerequisite: consent of the department. Used to comply with requests for more advanced special topics. May be repeated with approval of the department.

POLITICAL SCIENCE

Chairman: Professor Lyons

COURSE DESCRIPTIONS

Courses for Advanced Undergraduates and Graduates

PSC 301. POLITICAL SOCIALIZATION. (3) The study of the processes by which the political culture of the society is transmitted, formally and informally, to individual members. The course examines the learning process, the agents of socialization, the content of learning and the consequences of policital socialization for the functioning of the political system.

PSC 303. PUBLIC OPINION AND THE MASS MEDIA. (3) The nature and influence of public opinion and the effects of the news media on public opinion and political behavior. The course emphasizes research on the development and content of public opinion and social psychological studies on the process of opinion change.

PSC 305. ELECTORAL BEHAVIOR. (3) An examination of the psychological, sociological and political variables that influence voting behavior and that affect electoral stability and change. The course emphasizes studies derived from survey research.

PSC 307. ETHNIC POLITICS. (3) The role of racial, religious and nationality groups in American politics.

PSC 311. THE CONGRESS. (3) Analysis of the role of the Congress in the American political system and its relationship with the other branches of government. The course includes study of the recruitment and socialization of congressmen, the committee system and roll call analysis.

PSC 312. THE PRESIDENCY. (3) Analysis of the role of the Presidency in the American political system and its relationship with the other branches of government. The course includes study of the strategies of presidential nomination and election, the sources and indicators of presidential power, how those who have held the office have shaped it and been shaped by it.

PSC 313. JUDICIAL BEHAVIOR. (3) Survey of the empirical studies concerning the determinants of the behavior of judges.

PSC 314. AMERICAN CONSTITUTIONAL LAW. (3) Examines the development of American constitutionalism, with a major emphasis on the roles played by the Supreme Court in the emergence of the American political system. Studies the justices as intellectual personalities engaged in the formulation of national policies. Utilizes Supreme Court decisions and opinions, histories, biographies and political science analyses to study the evolution of governmental powers and individual

rights from colonial America through the end of the Roosevelt Court or Stone Court in 1946.

PSC 315. CIVIL RIGHTS AND LIBERTIES. (3) An analysis of Supreme Court decisions relating to civil rights and liberties.

PSC 317. POLITICS OF CRIMINAL LAW. (3) This course studies the politics of the Supreme Court's interactions with the Congress, Presidency, Justice Department and the states in the formulation of policies relating to the criminal law.

PSC 318. LAW AND SOCIAL CHANGE. (3) Examines the formulation of desegregation and poverty policies at the national, state and local levels. It studies the interaction of law and social change in these areas of public policy with an emphasis upon the political processes of courts and other legal subsystems.

PSC 321. URBAN POLITICS. (3) Analysis of the political process in the nation's metropolitan areas and the adjustments and responses of the U.S. governmental system in attempting to cope with the urban crisis.

PSC 322. CONTEMPORARY URBAN PROBLEMS AND POLICIES. (3) A study of selected urban problems, including an analysis of the causes and consequences of governmental policies designed to cope with these problems. Topics of interest would include: crime and law enforcement, poverty and welfare, urban transportation, education, pollution, housing and redevelopment and urban revenue and expenditure patterns.

PSC 331. THE NATURE OF POLITICAL CHANGE. (3) Comparative study of political change with reference to problems of reform, revolution and nation-building.

PSC 336. COMPARATIVE URBAN POLITICS. (3) Urban growth, urban problems and political response in cross-national perspective. Focus on the urban policy process including political explanations for variations in national urban growth and urban structure. Attention to selected case and comparative studies on the U.S., Europe, Latin America, Africa and Asia.

PSC 343. AFRICAN POLITICS. (3) A comparative perspective on the politics of independence in sub-Saharan Africa and on the performance of the new political systems there in terms of national and international integration and the modernization of traditional societies and economies.

PSC 345. GOVERNMENT AND POLITICS OF THE SOVIET UNION. (3) The origins of Bolshevism and the substance and role of Marxist-Leninist idealogy. The structure and function of the Communist Party of the Soviet Union (CPSU). The principles of Soviet politics and the instruments of rule. The Soviet political system in transition and its relationship to world communism.

PSC 357. AMERICAN FOREIGN POLICY. (3) Systematic study of contemporary American foreign policy-making.

PSC 357L. AMERICAN FOREIGN POLICY LABORATORY (1) The laboratory experience will allow students to simulate the decision-making process of the

United States government in the solution of key foreign policy issues. One laboratory period of two hours per week.

PSC 359. SOVIET FOREIGN POLICY. (3) The concepts, content and evolution of Soviet foreign relations, with emphasis upon change and continuity in Russian and Soviet policies. Contemporary problems of Soviet diplomacy with other world powers and with the Marxist-Leninist nations of the communist international system.

PSC 375. LEGAL THOUGHT. (3) A study of the contributions of natural law, legal positivism and legal realism to an understanding of what is the nature of law.

PSC 383. ADMINISTRATIVE BEHAVIOR. (3) The role of the administrator and public bureaucracy in modern democratic society. Particular attention will be given to the interplay of forces created by executives, legislators, political parties and interest groups.

PSC 384. DECISION MAKING IN PUBLIC ADMINISTRATION. (3) An examination of the major schools of decision making theory: rationalism, incrementalism and mixed-scanning. The use of these approaches in public administration in areas of budgeting, organization and program design and personnel will be studied, using problem sets and simulation techniques.

PSC 387. URBAN ADMINISTRATION. (3) A study of administration in the context of the urban setting. Attention will be given to urban governmental bureaucracies, their response to and interaction with their environments and their roles in developing urban policy.

PSC 392. INTRODUCTION TO SURVEY RESEARCH. (3) An examination of the purposes, logic and procedures of survey research in the study of political attitudes and behavior. The major steps in survey research—planning, sampling, questionnaire design, data collection, processing data and analysis—will be reviewed. The student will have an opportunity to apply newly acquired skills in a field situation.

PSC 399. PRACTICUM IN APPLIED POLITICAL SCIENCE. (1-3) Prerequisite: permission of the instructor. This course provides students with the opportunity to apply policital science concepts in a simulated (real-world) setting under the supervision of a faculty member. (May be repeated for credit with departmental permission.)

Courses for Graduate Students Only

PSC 600. TOPICS FOR GRADUATE STUDY IN POLITICAL SCIENCE. (1-4) Prerequisite: graduate standing. An intensive graduate-level study of a political topic. The particular topic investigated may vary from semester to semester, and a graduate may take more than one course under this number.

PSC 601. SEMINAR IN URBAN POLITICS. (3) Graduate-level course focusing on the historical relationship between politics and socioeconomic developments in urban areas. Contemporary fiscal problems and federal urban programs are also examined.

PSC 602. SEMINAR IN PUBLIC POLICY AND URBAN PROBLEMS. (3) A seminar on the causes and consequences of public policy on selected urban problems. Problems examined include urban revenue and expenditure patterns, housing and redevelopment, poverty and welfare, crime and law enforcement, environmental protection and public education.

PSC 606. SEMINAR IN COMPARATIVE PUBLIC POLICY. (3) Graduate-level course designed to focus on the urban policy process from a cross-national perspective. Those policy problem areas which the United States shares with the rest of the urban world, including growth management, housing, transportation and service delivery systems, will receive particular emphasis.

PSC 610. QUANTITATIVE RESEARCH METHODS IN URBAN ADMINISTRATION. (3) Theories of research design and measurement. Strategies for conducting research as well as the techniques employed in urban research problems.

PSC 611. INFORMATION SYSTEMS IN URBAN ADMINISTRATION. (3) Discussion and manipulation of data sets and information in urban administration. Attention will be given to the sources of information and their role in the administrative process.

PSC 620. PUBLIC VALUES AND URBAN ADMINISTRATION. (3) Survey of the normative environment in which urban administration exists and the role of the administrator in making value judgments.

PSC 621. URBAN ADMINISTRATION RESOURCE MANAGEMENT AND DEVELOPMENT. (3) The impact of public organizations on the urban economic environment is viewed from the perspective of securing funds for public activities and developing the urban area.

PSC 622. LAW AND URBAN POLICY. (3) Role of the judicial process in shaping urban policy in the field of urban administration and the role of administrative law in influencing behavior of urban public organizations.

PSC 623. SEMINAR IN ADMINISTRATIVE BEHAVIOR. (3) A survey of the field of public administration covering principles of administrative organization and management. Goal setting, program implementation, and evaluation are emphasized.

PSC 624. SEMINAR IN ADMINISTRATIVE DECISION MAKING. (3) Graduate-level course focusing on various organization and decision-making theories, including bureaucractic, human relations, environmental and systems approaches. The structure and processes of local, state and national governmental units will be examined in terms of how they affect public policy.

PSC 627. SEMINAR IN URBAN ADMINISTRATION. (3) A study of administration and management in an urban setting emphasizing goal setting, program implementation, and evaluation. The relationship between public policy and management is also described and analyzed.

PSC 630. PUBLIC BUDGETING AND FINANCIAL MANAGEMENT. (3) The theory and practice of budgetary techniques including capital budgets and the management of governmental outlays.

PSC 631. URBAN ADMINISTRATIVE SYSTEMS ANALYSIS. (3) Review of systems analysis as a tool in conceptualizing administrative problems and applying it in organization design and structure.

PSC 632. PUBLIC PERSONNEL MANAGEMENT. (3) A review of the context of public personnel administration, the development and impact of civil service systems, and the concepts and issues in contemporary practices in governmental organizations.

PSC 633. PUBLIC ORGANIZATION BEHAVIOR AND DEVELOPMENT. (3) The role of group relations in shaping public organization behavior and contemporary approaches of applied behavioral science in team building and organization development.

PSC 635. USES OF SCIENCE AND NEW TECHNOLOGY IN PUBLIC MANAGEMENT. (3) Development of technological innovations and their utilization in public management, including futuristic design of public organizations.

PSC 639. SEMINAR IN PUBLIC MANAGEMENT PROBLEM SOLVING. (3) Seminar devoted to topics in public management which involve problem identification and solution.

PSC 640. CONFLICT MANAGEMENT IN PUBLIC ORGANIZATION. (3) The role of the administrator as a focal point in social change and the management of the conflict which occurs. Perspectives on the negotiation and bargaining process will be reviewed.

PSC 645. SEMINAR IN ETHNIC POLITICS. (3) Graduate-level course emphasizing the role of ethnic, racial and religious groups in local and national politics. Historical and contemporary examples are examined.

PSC 648. SEMINAR IN LAW AND SOCIAL CHANGE. (3) Studies the relationship between law and social change with particular emphasis upon the urban context. Stresses the political processes of courts and other legal subsystems.

PSC 649. SEMINAR IN COMMUNITY RELATIONS. (3) Seminar devoted to contemporary topics in community relations, including relations of public organizations to the public and the role of advocacy planning in administration.

PSC 650. POLICY ANALYSIS METHODS. (3) Contemporary theories of policy analysis with special emphasis upon analytical techniques used to assess public policies. The role of social, political and cultural theories as they apply to the analysis of public policies.

PSC 651. APPLIED POLICY ANALYSIS. (3) An advanced consideration of policy analysis for the student. This course considers contrasting models of policy analysis and the appropriate quantitative techniques suited to each model. The

seminar requires the treatment of a specific public policy problem and the use of quantitative analysis in problem assessment.

PSC 652. CASES IN URBAN PUBLIC POLICY PROCESS. (3) Analysis of the process of public policy development, identification of most common sources for initiation of public policy, and their interrelationship in specific cases in urban policy formulation.

PSC 655. SEMINAR IN PUBLIC PROGRAM EVALUATION. (3) Seminar is designed to deal with the ramifications of policy issues by evaluating the impact of programs in regard to their effectiveness, cost-benefit, and socio-political externalities.

PSC 660. POLITICS OF RESOURCE MANAGEMENT PLANNING. (3) Politics of the planning process in allocating resources in urban administration. The course deals with the topics of land use, public recreation, pollution and growth development in resources.

PSC 669. SEMINAR IN THE POLITICS OF URBAN ADMINISTRATIVE PLANNING. (3) Advanced seminar devoted to a discussion of the interaction of the planning process and the urban polity.

PSC 685. URBAN INTERGOVERNMENTAL RELATIONS. (3) Survey of the complex relationships of governments in an urban environment set in the federal system. A review of the problems created by that system and the approaches to their solutions.

PSC 690-691. DIRECTED STUDY IN APPLIED URBAN ADMINISTRATION. (3) Individual project report on a directed topic of significance based on field experience in urban administration. *Pass/No Credit* grading.

PSC 695. ROBERT A. TAFT INSTITUTE OF GOVERNMENT. (3) Open under special arrangement. *Pass/No Credit* grading.

PSYCHOLOGY

Chairman: Professor Grimsley

COURSE DESCRIPTIONS

Courses for Advanced Undergraduates and Graduates

PSY 501. PSYCHOLOGY OF EXCEPTIONAL CHILDREN. (3) Assessing and treating the exceptional child. Emphasis on current research in several diagnostic categories, including the emotionally disturbed, learning disabled, mentally retarded, physically handicapped and gifted.

PSY 502. ADJUSTMENT PROBLEMS OF THE DISADVANTAGED. (3) A seminar concerned with such issues as racial attitudes, prejudice and poverty. Assigned reading and discussion deal with the application of psychological principles to these problems. Contributing lecturers with professional experience with problems of the disadvantaged will participate.

PSY 503. PSYCHOLOGY OF MENTAL RETARDATION. (3) An intensive study of the psychological and sociological aspects of mental retardation in relation to adjustment and educational development. Emphasis on current research and diagnostic categories.

PSY 504. TESTS AND MEASUREMENTS. (3) Prerequisite: PSY 101. A survey of psychological and educational measurements in current use. Emphasis will be placed on structure, administration and application of group tests. Individual tests such as Stanford Binet, WISC and WAIS will be reviewed.

PSY 505. ADVANCED PERSONALITY THEORY. (3) A critical evaluation of the major personality theories including an extensive survey of current research.

PSY 514. METHODS OF STUDENT EVALUATION. (3) Prerequisite: permission of the instructor. A practical course of construction of teacher-made evaluation procedures. Special emphasis will be placed on writing and item analysis of essay and restricted-response achievement tests.

PSY 520. PSYCHOLOGY OF THINKING. (3) The study of theories of learning, thinking and cognition, especially as they apply to the educational process.

PSY 599. SELECTED TOPICS IN PSYCHOLOGY. (3) Prerequisites: junior, senior, or graduate standing. Examination of special psychological topics.

RELIGIOUS STUDIES

Chairman: Professor Underwood

COURSE DESCRIPTIONS

Courses for Advanced Undergraduates and Graduates

REL 432. RELIGION AND MODERN THOUGHT. (3) Prerequisite: consent of the instructor. An intensive analysis of selected issues which stem from the interaction of modern thought and modern religious sensibilities.

Courses for graduate students only.

REL 690. DIRECTED STUDIES. (3) Prerequisite: consent of instructor. May be repeated for credit.

SOCIOLOGY AND ANTHROPOLOGY

Chairman: Associate Professor Rent

COURSE DESCRIPTIONS

Courses for Advanced Undergraduates and Graduates

ANT 321. CULTURE AND PERSONALITY. (3) Prerequisite: ANT 101 or consent of the instructor. A survey of anthropological contributions to theories of personality formation including data on tribal and national characteristics, patterns of child-bearing, culturally derived aspects of human behavior, deviancy, and personal integration with the cultural milieu.

ANT 490. TOPICS IN ANTHROPOLOGY. (1-3) Prerequisite: ANT 101 and consent of the department. Examination of specialized topics in Anthropology. May be repeated for credit as topics vary. An example of the courses which have been taught under this designation is:

AMERICAN INDIANS FOR TEACHERS. A course designed to assist elementary and social studies teachers in planning and teaching Indian Studies units in the classroom. Workshop sessions include lectures on Indian cultures and history, arts and crafts activities, music, dance, games, religion and folklore, languages and foods.

SOC 311. SOCIAL INEQUALITY. (3) Prerequisite: Introductory Sociology. Cross-cultural and comparative analysis of the distributive system of societies focusing upon the explanation of inequality among societies and the variations in power, privilege and prestige.

SOC 313. WORK IN MODERN SOCIETY. (3) Prerequisite: Introductory Sociology. Analysis of occupational and professional socialization and roles; career patterns and professional ideologies; and occupational structure and change.

SOC 315. BUREAUCRACIES AND ORGANIZATIONS. (3) Prerequisite: Introductory Sociology. Analysis of the structure and dynamics of complex organizations with special attention to rationalization through bureaucracy and the mechanisms of change.

SOC 322. POPULATION AND SOCIETY. (3) Prerequisite: SOC 151 or consent of the instructor. Cross-cultural comparison of populations, their growth, composition, and distribution for the past, present, and future. Emphasis upon those factors creating variations in the fertility, mortality, and migration of populations. Introduction to basic demographic measures and sources of demographic data used in community analyses is included.

SOC 324. SOCIOLOGY OF THE COMMUNITY. (3) Prerequisite: SOC 151. Analysis of the concept of community, methods of delineating and describing the dimensions of community and examination of planned and unplanned community change.

SOC 354. THEORIES AND THEIR CONSTRUCTION. (3) Prerequisite: SOC 353. Systematic analysis of competing and complementary theories in contemporary sociology and the acquisition and application of the basic skills of theory construction.

SOC 355. SOCIOLOGICAL RESEARCH METHODS. (4) Prerequisite: SOC 353. Examination and application of research principles and techniques for the verification of sociological propositions, including the formulation of the problem, the design of the research, and the collection, analysis and interpretation of the data. Three hours of lecture-discussion and a laboratory period of two hours each week.

SOC 361. SOCIALIZATION AND SOCIETY. (3) Prerequisite: SOC 151. Analysis and process of socialization and social interaction and the sociocultural dimension of personality.

SOC 363. SOCIOLOGY OF SMALL GROUPS. (3) Prerequisite: SOC 151 or consent of the instructor. Systematic analysis and application of theoretical and empirical research pertaining to the behavior of small groups.

SOC 372. SOCIOLOGY OF DEVIANT BEHAVIOR. (3) Prerequisite: SOC 151. Examination of the forms, causes, consequences and control of deviant behavior.

SOC 373. JUVENILE DELIQUENCY. (3) Prerequisite: SOC 151. Sociological analysis of the problem of youth crime with special attention to major sociological and social psychological theories of delinquency causation.

SOC 420. SEMINAR IN THE SOCIOLOGY OF HOUSING. (3) Prerequisite: SOC 151 or consent of the instructor. Examination of housing as both a social and physical variable in human life. Topics to be examined from a cross-cultural perspective include housing as a social problem, housing and its relationship to social policy, community development, social stratification, life cycle, racial-ethnic relations, individuals and neighborhoods, tenant-landlord relations, and alternatives in the future.

SOC 432. SEMINAR IN THE CHANGING AMERICAN FAMILY. (3) Prerequisite: Introductory Sociology, SOC 232 or equivalent, or consent of the instructor. Examination of the relationship between the family system and other institutions in the social system and how this relationship has changed over time. Emphasis is given to the integration of occupational, parental and marital roles.

SOC 435. SOCIOLOGY OF EDUCATION. (3) Prerequisite: SOC 151 or consent of the instructor. Analysis of the educational institution with emphasis upon the school class as a social system and the school as a social environment and a complex organization.

SOC 456. SEMINAR IN ADVANCED SOCIOLOGICAL INQUIRY. (3) Prerequisite: Completion of all other required core courses. Synthesis and utilization of basic sociological principles and techniques in supervised independent theorization and verification including the presentation of projects to seminar members and department faculty for evaluation and criticism.

SOC 461. HUMAN SEXUALITY. (3) Prerequisite: Introductory Sociology or consent of the instructor. Examination of social and social-psychological dimensions of human sexuality. Designed to stimulate the exploration of sexual values, both the student's own and those of others, and to provide a sociological understanding of the social and cultural setting in which these values are manifested.

SOC 463. SOCIOLOGY OF SEX ROLES. (3) Prerequisite: SOC 151 or consent of the instructor. Examination of changing sex role behavior in American society. Emphasis is given to socialization into sex roles, institutional sexism and alternative sex role models.

SOC 485. TOPICS IN APPLIED SOCIOLOGY. (3) Prerequisite: consent of the department. Specific prerequisites for each topic will be published. Explorations of uses of sociological skills in various occupational settings. Each offering of the course will be devoted to examining the uses of sociological skills in a specific ap-

plied setting. May be repeated for up to six hours credit as topics vary. (Descriptions of specific topics to be offered each term are available from the departmental office.)

SOC 490. TOPICS IN SOCIOLOGY. (1-3) Prerequisite: consent of the department. Examination of specialized sociological topics selected by students and faculty. May be repeated for credit. (A listing and brief description of specific courses offered each term is available from the departmental office.) Examples of courses which have been offered under this designation are:

AGING AND SERVICES TO THE AGED. Introduction to social gerontology including theories of aging, perspectives on aging and the place of the aging adult in society. Emphasis on societal responses to the aging adult through both public and private programs and identification of unmet service.

RELATIONS IN SCHOOLS. Examination of interpersonal and intergroup relations within elementary and secondary schools. Emphasis on the effect of the dynamics of intra-school relationships on teacher-student performance and attitudes and ways to assess and modify student-teacher relationships within classrooms.

SOCIAL SCIENCE RESEARCH FOR EDUCATORS. Application of basic social science research techniques to problems of concern to educators. Each student will have an opportunity to select a research problem relevant to his or her interests and proceed through the research process by means of a set of exercises.

SOCIAL SERVICES FOR CHILDREN AND YOUTH. Description and analysis of social welfare programs and practice as these relate to the needs and rights of children including unmet needs, issues and trends and the uses of planning and research to develop more effective programs.

SOC 495. DIRECTED INDIVIDUAL STUDY. (1-4) Prerequisite: consent of the department. Supervised investigation of a sociological problem of special interest to the student. May be repeated for credit.

SOC 510. INTERGROUP RELATIONS. (3) Prerequisite: Introductory Sociology or consent of instructor. Analysis of the social and social-psychological determinants of intergroup relations through an examination of labor-management relations, race relations, relations between social classes, ethnic, national and religious groups and other major social groupings in contemporary societies. Attention will be given to processes which introduce change in patterns of relations.

SOC 525. SEMINAR IN URBAN SOCIOLOGY. (3) Prerequisite: SOC 151 or consent of instructor. Seminar concerned with the development and change of urban societies utilizing cross-cultural comparisons and focusing upon social organization, ecology, demographic composition, social psychological attributes, and social problems of urban life.

SOC 557. ADVANCED GENERAL SOCIOLOGY I: SOCIAL STRUCTURE. (3) Prerequisite: consent of the department. Systematic examination of theories and

principles of social structure and organization with special emphasis on role and systems analysis and the segmentation and integration of society.

SOC 558. ADVANCED GENERAL SOCIOLOGY II: SOCIOCULTURAL CHANGE. (3) Prerequisite: consent of the department. Systematic examination of the principal theories and principles of sociocultural change with special emphasis on the evolutionary development of social types, industrialization and urbanization of American society and transition of developing countries.

College of Business Administration

Dean: Professor Neel

Enrollment in the following graduate courses offered by the College of Business Administration is normally restricted to graduate students who have completed all prerequisites and have been admitted to full standing in the Master of Business Administration program.

COURSE DESCRIPTIONS

MGT 611. ECONOMIC ANALYSIS I. (3) A study of the method of economic analysis employed in the examination of the external economic environment of the organization. The economic factors determining changes in national income and levels of economic activity in the nation, region and industry are considered and analyzed. Analytical concepts and techniques for forecasting general economic and industry activity are developed, and the relevance of such techniques for administration of organizations is examined.

MGT 612. ECONOMIC ANALYSIS II. (3) This course examines the operation of the pricing system within the various market structures of the economy. Included are the price and output decision of the firm under conditions of pure competition, monopoly, oligopoly and monopolistic competition. The problems of economic concentration, resource allocation and the role of government in a market economy are studied.

MGT 621. INFORMATION SYSTEMS. (3) A study of the planning, design, implementation and control of management information systems. Emphasis is placed on the merging utilization of more advanced information systems, the role of information management process and the networks necessary for efficient transmittal of information to the proper sources. Of particular importance is the generation and analysis of data for decision making.

MGT 622. QUANTITATIVE ANALYSIS FOR BUSINESS. (3) An analytical approach to the management process. Generalized models for decision making will be explored with major emphasis placed on the application of the scientific method to management problems.

MGT 631. MANAGERIAL ACCOUNTING. (3) A study of management's use of accounting. Topics include profit planning and control, evaluation of performance, cost analysis and income tax planning.

MGT 641. PRODUCTION MANAGEMENT. (3) This course draws upon the economic, behavioral, and quantitative disciplines to develop one's ability to manage in or around the operating systems of organizations—both manufacturing and non-manufacturing. A framework for analysis is developed and applied through cases, to decisions of capacity utilization, facilities planning, technological changes, and others.

MGT 651. FINANCIAL MARKETS. (3) A broad survey of both the money and capital markets. Interest rate determination and determinants of money supply and demand will be stressed. Emphasis will also be given to principal instruments within the interactions between the money and capital markets.

MGT 652. FINANCIAL MANAGEMENT. (3) Theory and practice of corporate finance including asset management, cost of capital and capital budgeting, optimization problems and socio-economic aspects of financial management. Computer technology will be employed.

MGT 653. INVESTMENT MANAGEMENT. (3) Theory and practice of investment problems of individuals and fund managers. Investment analysis, elements of the investment process and criteria for investment decisions will be emphasized with employment of the computer as relevant.

MGT 661. ADMINISTRATIVE PRACTICE I. (3) The purpose of this course is to develop a student's ability to analyze the conduct of people in organizations. Problems in motivation, leadership, conflict management, group dynamics, and organization structure are stressed.

MGT 662. ADMINISTRATIVE PRACTICE II. (3) This course is designed to cover topics in organizational development. Specific subjects covered are management by objectives, performance determinants and appraisal, design of complex organizations, team building, and organizational change.

MGT. 671. MARKETING AND LOGISTICS. (3) This course draws upon the disciplines of economics, the behavioral sciences and mathematics to develop perception and skill in marketing and logistics management. The focus is upon the decisions required to effectively balance the objectives and resources of the firm in developing successful marketing and logistics strategies. Case studies, simulations and computer techniques will be used in this course.

MGT 672. MARKETING RESEARCH AND FORECASTING. (3) This course will explore the techniques and methodology used in the collection, analysis and interpretation of economic, demographic and sociological data for use in managerial decision-making. The techniques of economic, industry and sales forecasting will be developed.

MGT 673. MARKETING COMMUNICATION AND PROMOTION. (3) The problems of mass communication, advertising, promotion and public relations will

be explored in depth. The legal and ethical problems involved in this area will be analyzed. Case studies will be used.

MGT 681. LEGAL ENVIRONMENT. (3) An intensive study of the common and statutory law which is applicable in a business decision making context. Emphasis will be placed upon Federal Regulatory Law and the role and functioning of the Federal Regulatory Agencies in supervising the scope of permissible business activities.

MGT 690. DIRECTED INDIVIDUAL STUDY. (3-6). This course is designed to permit a student to undertake directed individual study and in-depth analysis of a special area of management, economics, business or accounting. The course may be used to satisfy up to six semester hours of graduate credit requirements in the Master of Business Administration degree program and may be repeated for credit provided a different area of study is undertaken each time. Permission of a member of the graduate faculty who would direct the study must be secured before registering for the course.

MGT 692. BUSINESS AND SOCIETY. (3) Virtually every management decision has social consequences. The purpose of this course is to assist the student in developing perception and skill in analyzing the ethical, moral, political and social aspects of policy formulation and implementation. Management's responsibilities to consumers, employees, investor/owners and to society are stressed. Case studies are used extensively in this course.

MGT 694. MANAGEMENT POLICY. (3) The purpose of this course is to develop an understanding of the need to integrate the functional activities of the firm in planning corporate objectives and achieving operating results. Throughout the course, attention is given to developing the ability to identify issues and problems of the firm as a whole, to explore alternatives, and to make decisions which recognize the interrelationships of the functional specialties within the total organization. The student is expected to apply and integrate the knowledge and skills of analysis developed in the preceding courses of the MBA program.

MGT 696. STRATEGIC PLANNING. (3) This course focuses on the functioning of the firm or organization as a whole within a rapidly changing environment. Changing industry conditions, as well as technological, social, political and economic changes affect the firm as it plans for continuity of operation. Plans, strategies and implementing policies must be developed if the firm is to continue. Strategic planning techniques being developed by researchers and by corporate practitioners are studied. A major objective of the course is to assure that the student completing the professional MBA program can demonstrate application in a comprehensive manner. This is done through a study of cases, current information on company and industry applications, and through a major written project.

Chairman: Professor Davis

The following courses offered for graduate credit by the Department of Economics will not be accepted for graduate credit in the Master of Business Administration program in the College of Business Administration.

ECO 405. NEGOTIATIONS AND BARGAINING STRATEGY. (3) Prerequisites: ECO 202 and ECO 305. Cost/benefit analysis is applied to different theories of negotiation strategy. Emphasis is on the negotiation of collective bargaining contracts. Topics also covered include the use of arbitration, mediation, conciliation and fact-finding boards to resolve disputes.

ECO 412. ECONOMETRICS II. (3) Prerequisite: ECO 312 and CSC 100 or CSC 101. Tools of analysis developed in this course are more extensive and of a greater depth than those studied in ECO 312 and they allow problems of greater complexity to be studied. Regression and correlation techniques are applied to economic and business problems derived from government and business environments.

ECO 416. PUBLIC FINANCE. (3) Prerequisite: ECO 315 or ECO 370. The revenue and expenditure problems of governmental units. Intergovernmental financial relationships and the impact of federal fiscal policy upon the American economy.

ECO 435. ECONOMICS OF DEVELOPMENT. (3) Prerequisite: ECO 202. Different theories of economic growth and development are examined with a view to their applications to varying economic and social systems. Current theoretical models are studied in order to determine their relevance to efficient allocation of resources to both the developed and the developing nations.

ECO 449. WORK-STUDY PROGRAM IN ECONOMICS. (3 to 6 hours credit, by determination of Department of Economics). Prerequisites: ECO 201 and ECO 202. Enrollment granted only by permission of a faculty committee from the Department of Economics. Prior to enrollment, plans for the student's work assignments in this course must be completed. Assignments in governmental utilities, banking and other paid employment must utilize the techniques and principles learned in core requirements in economics. Work assignments require enough faculty contact with the student and employer to insure satisfactory performance by the student.

ECO 450. URBAN ECONOMICS. (3) Prerequisite: ECO 202. This course analyzes the inter-relationships of economic agents in an urban area, emphasizing manufacturing and households. Topics will include economic growth, urban location and land use, public finance and urban transportation.

ECO 455. REGIONAL ECONOMICS. (3) Prerequisite: ECO 202. An examination of factors that determine the economic activities of a region. Particular attention will be paid to issues such as income determination within a region and trade between regions. Other topics include competition between the North

and South, government action to encourage regional development and human migration between regions.

ECO 460. ECONOMICS OF TRANSPORTATION. (3) Prerequisite: ECO 202. An economic analysis of the transportation system. Topics covered include: historical development of the various modes, costs and rate-making, regulation and national transportation policy.

ECO 471. ECONOMICS OF INTERNATIONAL TRADE. (3) Prerequisite: ECO 201. An examination of the theory of international trade. Topics covered include determination of international trade patterns, the welfare implications of international trade, the effects of tariffs and quotas, economic integration and international trade and the LDC's.

ECO 472. ECONOMICS OF INTERNATIONAL FINANCE. (3) Prerequisite: ECO 201. A survey of international monetary theory. Detailed discussion is undertaken of exchange rate determination, balance of payments and adjustment, international liquidity, capital movements, international financial organizations and monetary reform proposals.

ECO 477. EVOLUTION OF ECONOMIC THOUGHT. (3) Prerequisite: ECO 202. The development of the great economic ideas of value, distribution, employment, with special emphasis on the foundations of classical economic thought.

ECO 480. INDUSTRIAL ORGANIZATION AND PUBLIC POLICY. (3) Prerequisite: ECO 202. An examination of the characteristics of various types of industries—competitive, oligopolistic, monopolistic and monopolistically competitive—and of the questions of public policy in dealing with problems created by industrial concentration.

ECO 482. PUBLIC UTILITIES. (3) Prerequisite: ECO 202. A study of the fundamentals of public utilities, with an emphasis on the theory and methods of rate-making and regulation in public utilities.

ECO 502. AMERICAN ECONOMIC DEVELOPMENT. (3) No prerequisites. A course primarily designed for public school teachers. Emphasis is on issues and examples that lend themselves to classroom presentation in the social studies area of public school curriculum. Includes the development, meaning and functioning of the institutions which characterize the American economy. May not be taken for upper-level elective credit in Business or Economics, but may be taken for general university elective credit by College of Business majors and others. This course shall not be accepted for graduate credit in the Master of Business Administration program.

College of Engineering

Acting Dean: Associate Professor Evett

Every student enrolled in the Master of Science in Engineering program must have a designated major in one of the departments of the College, namely, Engineering Analysis and Design, Engineering Science, Mechanics and Materials, or Urban and Environmental Engineering. It is assumed that most programs of study will fall into one of these three general plans:

18 hours of engineering + 6 hours of math or science + 6 hours of business, geography, etc.

18 hours of engineering + 12 hours of math or sciences

24 hours of engineering + 6 hours of math, science, business, geography, etc.

The following numbering system has been employed:

400 level — courses intended for undergraduate credit but, with the approval of the department offering the course and the student's Program Committee, can be used for graduate credit (maximum of 12 hours for a student).

500 level — courses intended primarily for graduate students but open to advanced undergraduate students subject to departmental approval.

600 level — courses open to graduate students only.

Undergraduate students in engineering who are within less than 12 semester hours of graduation may, with the approval of the adviser and major department chairman, enroll in courses for which they may receive graduate credit after obtaining the BSE and being admitted to the graduate program. Such course work may not be counted toward fulfilling the requirements for the BSE degree. The total course hours carried in this status may not exceed 12 of which no more than nine may be for graduate credit.

COURSE DESCRIPTIONS

ENGINEERING ANALYSIS AND DESIGN

Chairman: Professor Wayne

EAD 415. MECHANICAL VIBRATING SYSTEMS. (3) Prerequisite: ESM 341 or permission of department. A study of free and forced vibrations of systems with multidegrees of freedom. Transient vibrations, analog simulation, non-linear vibrations and the vibration of continuous systems.

EAD 421. MACHINE ANALYSIS AND DESIGN I. (3) Prerequisite: EAD 322 with a grade of C or better. Senior standing. Technical application of the basic principles of the mechanical science to the analysis of machines and mechanical systems. Methods of design of typical machine elements. Strength and deflection requirements.

EAD 422. MACHINE ANALYSIS AND DESIGN II. (3) Prerequisite: EAD 421 with a grade of *C* or better. Synthesis of machines and mechanical systems. Analysis, creative design and selection of machines and machine elements.

EAD 431. ELECTRONICS. (3) Prerequisite: EAD 332 with a grade of *C* or better. A study of electronic or semiconductor devices: transistor and vacuum tube power devices, audio and radio frequency amplifiers, tunnel diode amplifiers, high frequency amplifiers, feedback analysis of vaccum tube and transistor circuits, modulation and demodulation theory and related circuitry. Generalized oscillary analysis.

EAD 432. COMPUTER ELECTRONICS. (3) Prerequisite: EAD 431 with a grade of *C* or better. Study of logic and gate circuits, wave-shaping circuits, switching circuits, multi-vibrators, pulse circuits.

EAD 441. ELECTRIC POWER SYSTEM ANALYSIS I. (3) Prerequisite: EAD 312 and ESM 321. A study of polyphase networks, power transmission lines and power network representations. System representations, network equations and solutions. Application of digital computer to power system analysis.

EAD 442. ELECTRIC POWER SYSTEM ANALYSIS II. (3) Prerequisite: EAD 441 with a grade of *C* or better. A study of symmetrical components and their applications. Symmetrical and unsymmetrical fault and load considerations. Load flow problems and numerical methods. Economic operation and stability studies.

EAD 443. ELECTRIC MACHINERY. (3) Prerequisite: EAD 312. Direct-current machines, induction machine. Machines in control systems. Synchronous machines. Fractional horsepower motors.

EAD 481. SWITCHING THEORY AND LOGIC DESIGN II. (3) Prerequisite: EAD 382 with a grade of *C* or better or EAD 281 with a grade of *C* or better and permission of department. A continuation of EAD 382 including sequential circuit synthesis, state assignments, and flow table reduction. Top-down design with stress on engineering considerations and applications.

EAD 482. DIGITAL SYSTEMS THEORY. (3) Prerequisite: EAD 382 with a grade of *C* or better or EAD 281 with a grade of *C* or better and permission of department. The primary emphasis will be on the engineering aspects of digital systems design. Analysis and design of multiplexers, A/D and D/A converters, data communications, and system interfacing. Interrupt generation and processing.

EAD 513. NONLINEAR ANALYSIS. (3) Prerequisite: EAD 312. Solution of nonlinear problems using numerical and graphical methods, phase plane plots, analysis of singular points and analytical techniques. Forced oscillating systems. Stability of nonlinear systems. Use of analog and digital computer to study nonlinear problems.

EAD 514. NETWORK SYNTHESIS. (3) Prerequisite: EAD 314 with a grade of *C* or better. The positive real concept, properties and methods of testing. Realizability conditions on driving point functions. Methods of synthesis of one-

ports. Physical realizability and properties of two-port networks. Transfer function synthesis. Approximation methods.

EAD 531. DATA COMMUNICATIONS. (3) Prerequisites: EAD 382 and EAD 332. Topics inlcude asynchronous communicatons, UARTS; 20 ma loop, CCITT, RS-232-C, and RS-422/3 standards; telephone switching systems, model control, asynchronous models; error detection; synchronous communication; protocols, bisync, SDLC; packet switching.

EAD 533. COMMUNICATIONS THEORY I. (3) Prerequisite: EAD 314. A study of information transmission and modulation systems. Analysis of transmission through electric networks, analysis and comparison of modulation systems, analog and digital communication systems; sampling theory and noise.

EAD 561. ADVANCED COMPUTER UTILIZATION IN ENGINEERING. (3) Prerequisite: consent of the instructor. The use of computers in large scale engineering problems. Topics include flow diagrams, matrix analysis of systems, application of iteration methods to non-linear problems, eigenvalue problems, optimization and handling of large engineering data base problems. Engineering applications will be emphasized.

EAD 583. ENGINEERING SIMULATION. (3) Prerequisite: EAD 381 or consent of the instructor. A wide range of simulation related topics will be introduced including the theory of simulation, characteristics of simulators, and tradeoffs in simulation studies. Continuous and discrete simulation with primary emphasis on application of simulation techniques to engineering problems. Simulation of actual problems based on students' interest and experience areas.

EAD 611. SYSTEMS THEORY. (3) Prerequisite: EAD 412 or consent of instructor. State space concepts and solutions. Introduction to theory of deterministic linear systems. Application of matrix methods and vector difference equations to lumped parameter electrical mechanical, and fluid systems, and discrete time systems. Frequency domain techniques in signal and systems analysis. Computer simulation of system dynamics.

EAD 641. OPERATION OF INTEGRATED POWER SYSTEMS. (3) Prerequisite: EAD 442 or consent of instructor. System modeling and matrix analysis of power networks. Application of computers to the solution of a variety of problems related to operation, planning, and design of electric power systems.

EAD 661. OPTIMIZATION OF ENGINEERING DESIGNS. (3) Prerequisite: EAD 561 or consent of instructor. The development of computationally feasible algorithms for solving optimization problems in engineering designs. Introduction to non-linear programming methods; study of constrained and unconstrained problems, linear programming problems and other related topics.

EAD 680. COMPUTER SYSTEM ENGINEERING. (3) Prerequisite: EAD 481 or consent of instructor. Topics include data formats, register transfer operations, computer organization, microprogram control and ALU design. Arithmetic algorithms, I/O organization, and memory organization are also covered. Specific emphasis is placed throughout on trade-offs between hardware and software.

EAD 681. SWITCHING AND AUTOMATA THEORY I. (3) Prerequisite: EAD 680 or consent of instructor. Topics include sets, relations, lattices, Boolean algebras; functional decomposition and symmetric functions; threshold logic; multiple-valued logic; fault detection and fault tolerant design; finite state machines, incompletely specified machines, minimization; state identification and fault-detection experiments; finite state recognizers.

EAD 683. MULTIPROCESSOR SYSTEMS DESIGN. (3) Prerequisites: EAD 481 and EAD 531. Topics include applications of multiprocessors to digital systems design; hardware/software trade-off considerations; master/slave, multiple-master, and loosely coupled systems; data handling and synchronization problems; networking.

ENGINEERING SCIENCE, MECHANICS AND MATERIALS

Chairman: Professor DeHoff

ESM 411. HEAT TRANSFER. (3) Prerequisite: ESM 311 and 342. Steady and unsteady state heat conduction, forced and natural heat convection principles, radiative heat transfer, heat exchangers.

ESM 412. ENERGY CONVERSION I. (3) Prerequisites: ESM 311 and 342. Application of principles of thermodynamics, fluid flow and heat transfer to internal combustion engines, compressors, turbines, heat exchangers, refrigeration, and cryogenics.

ESM 422. ANTENNAS. (3) Prerequisite or corequisite: ESM 322. A study of radiation into free space, the point source, thin linear antenna, arrays of linear elements, aperture antennas, impedance, methods of feeding, matching and termination. A survey of various antenna systems.

ESM 426. ACOUSTICS. (3) Prerequisite or corequisite: ESM 322 or Physics 331. Vibrations and simple vibrating systems; radiating systems; plane waves of sound; dynamic analogies, microphones and other acoustic transducers; acoustic measurements.

ESM 434. SOLID STATE ELECTRONICS. (3) Prerequisite: ESM 321 or ESM 331 or Physics 331 or consent of instructor. Electron theories of solids. Quantum mechanical foundations. Free electron and band models. Electron transport processes in metallic and nonmetallic conduction; diffusion and drift phenomena. Theory of semiconductors.

ESM 441. INTERMEDIATE SOLID MECHANICS. (3) Prerequisite: ESM 341. More advanced treatment of the topics covered in ESM 341. Included are failure theories, energy methods, plane stress-plane strain analysis, torsion of prismatic bars, curved beams and related topics.

ESM 442. INTERMEDIATE FLUID MECHANICS. (3) Prerequisites: ESM 311 and 342. A continuation of ESM 342. Topics covered include boundary layers, flow over body surfaces, compressible flow, turbomachinery and propulsion devices.

ESM 444. INTERMEDIATE DYNAMICS. (3) Prerequisite: ESM 242 and Math 271. Further studies in the dynamics of particles and rigid bodies, with engineering applications. An introduction to Lagrange's equations of motion. Multi-degree-of-freedom vibrations.

ESM 461. SOLID STATE TRANSFORMATIONS. (3) Prerequisite: ESM 361. Thermodynamics, morphology, and kinetics of solid state transformations. Diffusion and absolute reaction rate theory; crystallograhic nature of phase transformations; nucleation and growth processes; precipitation and oxidation reactions.

ESM 502. INTRODUCTION TO CONTINUA. (3) Prerequisites: ESM 311, 321, 341, 342 or consent of instructor. A unified treatment of those topics which are common to all continua. Stress, deformation and velocity fields, constitutive equations, and field equations. Representative applications in solid, fluid and electromagnetic continua, including interaction problems.

ESM 513. ENERGY CONVERSION II. (3) Prerequisite: ESM 311. Study of conversion of heat into power. Thermoelectric, magnetohydrodynamic engines, thermionic converters, solar and fuel cells.

ESM 514. DYNAMICS AND THERMODYNAMICS OF COMPRESSIBLE FLOW. (3) Prerequisites: ESM 311 and 342. Compressible flow equations, isentropic flow, normal shock waves. Fanno and Raleigh line flows. Nonsteady one dimensional flow.

ESM 531. PHYSICAL ELECTRONICS. (3) Prerequisite: ESM 322 or Physics 331 or consent of instructor. Dynamics of charged particles; electron motion in electromagnetic fields; types of electron emission; beam focusing; longitudinal and transverse beam waves, microwave generation; plasma parameters.

ESM 532. QUANTUM AND PARAMETRIC ELECTRONICS. (3) Prerequisites: ESM 322 or Physics 331 or consent of instructor. Introduction to the concepts of quantum mechanics; spin energy levels; elementary masers, optical resonance; traveling wave tubes; backward wave oscillators.

ESM 546. EXPERIMENTAL STRESS ANALYSIS. (3) Two lectures and one two-hour lab per week. Prerequisite: ESM 341. Theoretical and experimental techniques of stress and strain analysis, with experimental emphasis on strain gages and instrumentation. Brittle coatings and photoelasticity are also considered.

ESM 562. MATERIALS PRODUCTION AND PROCESSES. (3) Prerequisite: ESM 361 and consent of instructor. Applications of thermodynamics and chemistry to extractive process metallurgy. Fundamental principles of materials forming operations. Casting, mechanical working, and joining methods.

ESM 564. DIFFRACTION AND SPECTROSCOPIC STUDIES OF MATTER. (3) Prerequisites: senior or graduate standing and consent of instructor. Atomic arrangements in crystalline and noncrystalline forms of matter. Symmetry properties of crystals and correlations with anisotropic physical properties. X-ray diffraction and spectroscopic analysis of matter.

ESM 615. TRANSPORT PROCESSES. (3) Prerequisite: graduate standing and consent of instructor. Unified field theory approach to the fluid transport of momentum, energy, mass and electrical charge. Statistical theories of turbulence and molecular transport. Multiphase systems, chemically reacting flows, ionized fluids, separation processes.

ESM 618. NUCLEAR REACTOR THEORY. (3) Prerequisite: graduate standing and consent of instructor. Neutron transport theory applied to the engineering design of nuclear reactors. Generation, diffusion, and slowing down of neutrons. Nuclear ballistics and collision phenomena. Reactor kinetics and thermodynamics. Homogenous and heterogenous reactors.

ESM 623. ADVANCED TOPICS IN ELECTROMAGNETIC THEORY AND APPLICATIONS. (3) Prerequisite: Graduate standing and consent of instructor. Possible topics include: advanced boundary value problems; nonlinear magnetic materials; wave guides and resonant cavities; magnetohydrodynamics and plasmas; relativistic effects; charged particle dynamics; radiation.

ESM 640. APPLIED ELASTICITY. (3) Prerequisite: ESM 441 and graduate standing and consent of instructor. Topics from the theory of elasticity including but not limited to: beams on elastic foundations; general torsion and bending; contact stresses; simple problems in plates and shells; nonlinear elasticity.

ESM 645. ADVANCED TOPICS IN DYNAMICS. (3) Prerequisite: graduate standing and consent of instructor. Courses in selected topics and advanced studies in dynamics such as Lagrangian dynamics, vibrations of continuous media, stress wave propagation, and motion measurement.

ESM 666. DEFORMATION AND FRACTURE OF MATERIALS. (3) Prerequisite: graduate standing and consent of instructor. Macroscopic and microscopic aspects of elastic and plastic deformation and fracture; applications of dislocation theory to an interpretation and control of mechanical properties; temperature, strain rate and texture effects.

URBAN AND ENVIRONMENTAL ENGINEERING

Chairman: Professor King

UEE 422. STRUCTURAL STEEL DESIGN II. (3) Prerequisite: UEE 421 with grade of *C* or better. Analysis and design of structural steel systems with emphasis on the fundamental theories necessary for a thorough understanding of the design of complete structures. Welded, riveted, and bolted connections. Design of steel buildings, composite design, built-up beams and plate girders. Plastic analysis and design. Emphasis to be placed on various topics partially dependent upon student interest and goals. Current AISC Specifications used.

UEE 424. ADVANCED STRUCTURAL ANALYSIS. (3) Prerequisite: UEE 321 and ESM 341 with grades of *C* or better. Fundamental and special methods of analysis of statically indeterminate structures.

UEE 426. REINFORCED CONCRETE DESIGN II. (3) Prerequisite: UEE 425. Analysis and design of reinforced concrete components and systems with emphasis on the fundamental theories necessary for a thorough understanding of concrete structures. Concentrically loaded slender columns, slender columns under compression plus bending. Footings and retaining walls. Continuous beams and frames. Buildings and bridges. Precast and prestressed concrete. Emphasis to be placed on various topics partially dependent upon student interest and goals. Current ACI Specifications used.

UEE 442. ENVIRONMENTAL ENGINEERING II. (3) Prerequisite: UEE 341. A continuation of UEE 341. Industrial wastes; stream and reservoir pollution abatement; river basin and estuarine studies; solid waste disposal and ground water pollution; air pollution sources, dispersion, and deposition; environmental effects of radioactivity, computer modeling.

UEE 462. URBAN TRANSPORTATION ENGINEERING. (3) Prerequisite: UEE 361 or consent of instructor. Urban transportation considerations; travel characteristics of urban transportation systems; analysis of transportation-oriented studies; analytic methods of traffic generation, distribution and assignment; urban layout and growth patterns.

UEE 522. ADVANCED TOPICS IN STRUCTURAL STEEL. (3) Prerequisites: UEE 422 or consent of instructor. Theory of plastic behavior of steel structures; current topics in structural steel as they develop.

UEE 528. MATRIX METHODS OF STRUCTURAL ANALYSIS. (3) Prerequisite: consent of instructor. Derivation of the basic equations governing linear structural systems. Application of stiffness and flexibility methods to trusses and frames. Solution techniques utilizing digital computer.

UEE 544. ENGINEERING HYDROLOGY. (3) Prerequisite: consent of instructor. A quantitative study of the various components of the water cycle, including precipitation, runoff, ground water flow, evaporation and transpiration, stream flow. Hydrograph analysis; flood routing; frequency and duration; reservoir design; computer simulation model of a water-shed.

UEE 546. ENGINEERING HYDRAULICS. (3) Prerequisite: consent of instructor. Problems of fluids as applied in civil engineering; open channel flow; dams and spillways; water power; river flow and backwater curves; pipe networks, fire flow, sewage collection, groundwater; computer applications including a hydraulic water model simulation.

UEE 561. URBAN TRAFFIC ENGINEERING. (3) Prerequisite: UEE 361 or consent of instructor. Analysis of basic characteristics of drivers, vehicles and roadway that affect the performance of road systems. Stream flow elements, volume, density, speed. Techniques of traffic engineering measurements, investigations, and data analysis, capacity analysis. Intersections, accidents, parking.

UEE 565. URBAN SYSTEMS ENGINEERING. (3) Prerequisite: UEE 472 or consent of instructor. Survey of economic, political, sociological and technologi-

cal factors affecting modern growth; a planning process and its role in solving selected urban problems with emphasis on engineering contributions.

UEE 629. STRUCTURAL DYNAMICS. (3) Prerequisite: consent of instructor. Analysis and design of structures subject to dynamic and static loading, single degree of freedom approach, vibration of structural components including damping and elasto-plastic behavior.

UEE 641. STREAM POLLUTION ANALYSIS. (3) Prerequisite: consent of instructor. A study of stream pollution analysis including: sources of pollution and types of waste; waste assimilation capacity; self purification; biological, biochemical, and hydrological considerations in stream analysis; estuarine analysis. Computer model simulation.

UEE 661. URBAN TRAFFIC CONTROL AND OPERATION. (3) Prerequisite: UEE 561 or consent of instructor. Traffic control theory and application; traffic regulation, laws and ordinances; speed control, intersection control, flow control and parking control; design and application of control devices, investigation, evaluation techniques; statistical analysis; administration.

UEE 671. AIR QUALITY CONTROL. (3) Prerequisite: consent of instructor. Study of various types of air pollutants, their sources, nature and effects. Examination of air quality criteria, standards, and monitoring. Analysis of feasibility, applicability and efficiency of diverse systems of control. Evaluation of goal and research needs in the future.

UEE 681. TRAFFIC FLOW THEORY. (3) Prerequisite: UEE 561 or consent of instructor. Logical foundations and mathematical representation of traffic flow; interrelation between microscopic and macroscopic equations of motion for highway traffic; stochastic properties of traffic at low and moderate densities. Car following theories of traffic flow at high densities. Applications of queueing theory to transportation.

UEE 682. TRANSPORTATION SYSTEMS ANALYSIS. (3) Prerequisite: UEE 561 or consent of instructor. Issues, concepts and methods of transportation systems engineering and planning. Decision making in transportation management. The application of analytical methods to the development and evaluation of transport systems.

NON-DEPARTMENTAL COURSES

EGR 538. FINITE ELEMENT ANALYSIS AND APPLICATIONS. (3) Prerequisite: consent of instructor. An introduction to the finite element method and its application to engineering problems. Application of the displacement method to plane stress, plane strain, plate bending, and axisymmetrical bodies. Topics include but are not limited to: dynamics, heat transfer, fluid mechanics, structural mechanics and electric fields.

EGR 590. SPECIAL TOPICS. (1-6) Directed study of current topics of special interest. May be repeated for credit.

EGR 592. INDIVIDUALIZED STUDY AND PROJECTS. (1-6) Individual investigation and exposition of results. May be repeated for credit.

EGR 690. SPECIAL TOPICS. (1-6) Directed study of current topics of special interest. May be repeated for credit.

EGR 691. GRADUATE THESIS RESEARCH. (1-6) Individual investigation culminating in the preparation and presentation of a thesis. May be repeated for credit.

EGR 692. INDIVIDUALIZED STUDY AND PROJECTS. (1-6) Individual investigation and exposition of results. May be repeated for credit.

College of Human Development and Learning

Dean: Professor Heller

The College of Human Development and Learning has primary responsibility for the Master of Human Development and Learning. This includes responsibility for admission and advising in the selection of a course sequence fulfilling the requirements for the degree.

PHASE I

EXPLORATIONS IN HUMAN POTENTIAL
(Philosophical and Psychological Foundations)

HDL 600. THEORIES OF HUMAN DEVELOPMENT AND LEARNING. (3) An introductory graduate course designed to study the philosophical concepts of the nature of man and human potential. Emphasis will be given to the major theories of human development as they influence growth in relation to interaction of people, social structures, environments and this influence upon service delivery systems designed to improve the quality of life.
HDL 600 or its equivalent is prerequisite to all other graduate courses.

HDL 601. RESEARCH IN HUMAN DEVELOPMENT AND LEARNING I. (3) This course provides the student the fundamental concepts of empirical, logical, and conceptual kinds of research which study problems and questions arising in the general area of human development. The course includes the development of the following proficiencies: Using the library research facilities, writing reviews of the literature and interpreting research reports, operationalizing researchable questions and problems, designing basic proposals for research and practicing a formal reporting style. (No prerequisites).

HDL 602. THE PERSON AND SCHOOL IN URBAN SOCIETY. (3) A study of the basic philosophical theories and social forces that influence the objectives, organizations and programs of schools, agencies, and institutional care in a changing society.

HDL 603. EDUCATIONAL ASPECTS OF DEVELOPMENTAL EXCEPTIONALITIES. (3) A course designed to study selected theories and concepts in humanistic education and learning as well as the impact of stigma as related to the practice of education for the exceptional child.

HDL 604. THE FACILITATION OF MEANING. (3) A philosophical study of the comparative concepts of meaning with particular attention to their impact on solutions offered to learning, methods, organization and curriculum of schools, agencies, and institutions in American society.

HDL 605. ADOLESCENCE AND LEARNING. (3) An in-depth study of the physical, affective and cognitive development of the adolescent and the impact of these factors upon learning. Emphasis is placed on the exceptionalities of adolescence and their impact on education through the utilization of case studies, observation, lecture and discussion.

HDL 606. ADJUSTMENT PROBLEMS, CHILDREN AND YOUTH. (3) A study of adjustment problems of childhood and adolescence in relation to theoretical postulates and to school problems. Special emphasis is given to problems of behavior and attitudes toward learning and relationships.

HDL 608. LEARNING AND DEVELOPMENT. (3) Investigations in the historical and contemporary explanations of the learning phenomena particularly as they apply to the teacher/learner relationship. Emphasis is placed on the relationship between learning and other aspects of the process of growth and development.

HDL 609. INTEREST, APTITUDE, INTELLIGENCE. (3) Study of the social, psychological and philosophical concepts of interest, aptitude and intelligence as they contribute to the understandings of an individual. Opportunities as provided for students to become familiar with the theoretical concepts involved in assessing these facets of human behavior as well as to gain some experience in administering and interpreting current evaluative instruments in the field.

HDL 610. THE DESIGN AND ANALYSIS OF RESEARCH IN HUMAN DEVELOPMENT AND LEARNING. (3) This seminar is designed to enhance the individual's ability to conduct and utilize research to contribute to understanding of human potential. Emphasis will be given to the selection of experimental variables, research design, sampling techniques and data gathering and analysis procedures. Opportunities will be provided for the student to plan and analyze research in a particular field of interest.

HDL 612. PHYSIOLOGICAL ASPECTS OF LEARNING. (3) A survey of the human nervous system and the multiple factors affecting the functioning of the nervous system. Attention is given to different developmental abnormalities and disease processes at different ages and the effect of these factors on learning. Emphasis is placed upon the application of these concepts in working with children and youth.

HDL 620. CURRICULUM THEORY. (3) A study of the theoretical constructs of curriculum and the nature of experience as they relate to facilitation of the transition from theory to practice. The course is organized to be taught by a team giving opportunities for the student to study in depth areas of interest and need. Emphasis is placed on research and experimentation in the development of theory, processes, materials and relationships in curriculum design and human experiences.

HDL 621. STRATEGIES AND DESIGNS IN HUMAN DEVELOPMENT AND LEARNING. (2) A study of the principles and practices for research and development of programs and evaluation in Human Development and Learning. This course is organized to be taught by a team giving opportunities for the student to study in depth developmental designs, preventive programs, objectives, and organization in areas of need and interests such as: (A) Human Development, (B) Teaching, (C) Administration, (D) Supervision, (E) Counseling, (F) Curriculum, (G) Exceptionality, (H) Parent Education, and (I) Child Advocacy in relationship to learning environments. Emphasis is given to the theories of creativity in relation to the investigation of such areas as the scope of the environment, designs and models, alternative systems, learning centers, and resources.

HDL 622. CREATIVITY, LEARNING ENVIRONMENTS, AND EXPERIENCES. (3) Designed to investigate theories of creativity in relationship to learning environments. Emphasis is given to the theories of creativity in relation to the investigation of such areas as the scope of the environment, designs and models, alternative systems, learning centers, and resources.

HDL 625. CONCEPTS OF TEACHING AND LEARNING. (3) A course designed to provide the student with an opportunity to critically examine current trends and practices in particular areas of the curriculum such as: (A) Integrated Studies, (B) Language Development and Reading, (C) Science, (D) Mathematics, (E) Gifted and Talented, (F) Children's Play, (G) Children's Writing and (H) Learning Disabilities.

HDL 626. CONCEPTS OF DIAGNOSTIC INSTRUCTION. (3) A course designed to provide the student with an opportunity to study the theory of and to develop his individual diagnostic techniques in particular areas of specialization such as: (A) Learning Disabilities, (B) Reading, (C) Gifted and Talented and (D) Mathematics.

HDL 630. EXAMINATION AND APPRAISAL OF READING INSTRUCTION. (3) Aspects of the reading program ranging from readiness to diagnostic and remedial techniques. Current practices and materials used in reading programs are investigated and evaluated. Emphasis will be placed on a flexibility of programs to meet the learning needs of individual students.

HDL 635. LEARNING MEDIA, RESOURCES AND TECHNOLOGY. (3) The selection, use and evaluation of technological innovations in instructional media will be studied. Laboratory experiences will emphasize media application in the enrichment of the instructional program.

III
THE HELPING RELATIONSHIP

HDL 660. BEHAVIORAL ANALYSIS OF ADMINISTRATION. (3) An extensive study of the behavioral components of administrative theory, organization, decision making and planning for educational development. An appraisal of significant functions, techniques, practices and problems as they relate to the public school systems, to other social institutions, with the system of social and governmental entities.

HDL 661. THE PRINCIPALSHIP. (3) A comprehensive examination of school administration focusing on the role, tasks, and responsibilities associated with the principalship. Special attention will be given to the conceptual, human, and technical skills associated with the principalship.

HDL 663. DEVELOPMENTAL APPROACHES TO THE THEORY AND PRACTICE OF GUIDANCE. (3) A study of guidance and counseling as a developmental concept with emphasis upon the philosophical, social and psychological bases for the helping relationship. Experiences are provided to facilitate the necessary competencies—self analysis, value judgments and the creation of relationships needed to facilitate the growth of others toward personhood.

HDL 665. ANALYZING AND DEVELOPING APPROACHES TO THE HELPING RELATIONSHIPS. (3) A course designed for the study of ways, means and concepts of improving instruction, learning and development through the helping relationship. The course is organized to be taught by a team giving opportunities for the student to study in depth areas of interest and need such as: (A) Person to Person Relationships, (B) Group Process and Behavioral Change, (C) Counseling, (D) Supervision, (E) Leadership and other approaches and processes defined as the helping relationship.

IV
EXPERIENCE AND COMMITMENT IN HUMAN DEVELOPMENT AND LEARNING

Courses for Advanced Undergraduates and Graduates

HDL 570. SELECTED TOPICS IN HUMAN DEVELOPMENT AND LEARNING. (3-6) Prerequisite: HDL 250 and permission of the College of Human Development and Learning. Topics and special problems chosen in relation to human learning, ideas, practices, significant movements or detailed study and clinical experiences. May be repeated for credit with approval. Offered only on a *Pass/No Credit basis.*

HDL 670. RESEARCH IN CLINICAL EXPERIENCES IN ANALYZING TEACHER/LEARNER BEHAVIOR. (3-6) Prerequisite: permission of the College of Human Development and Learning. A course designed to provide observational and teaching experiences as a member of a teaching team in: (A) Early Childhood Education, (B) Intermediate Education, (C) Secondary Education and in other areas of teaching interests. The course is designed to provide supervision, analysis and planning by a specialist in various areas. Emphasis will be given in instructional change, program development and to the development of unique teaching styles. These experiences are organized with children in a model setting. Offered only on a *Pass/No Credit basis.*

HDL 671. SEMINAR AND INTERNSHIP IN HUMAN DEVELOPMENT AND LEARNING. (3-6) Prerequisite: permission of the College of Human Development and Learning. Supervised experiences in observation, involvement and administrative participation in clinical settings in schools, clinics, learning centers, social agencies and other centers devoted to human development and learning. Emphasis is given to independent experiences and to experience as a member of a learning team in relation to behavior, behavior analysis and to the personal and professional growth of the intern in: (A) Teaching, (B) Counseling, (C) Administration, (D) Supervision, (E) Leadership, (F) Learning Disabilities, (G) Reading, (H) Gifted and Talented, and (I) Interprofessional Internship Seminars, held concurrently with the internship experience, are designed to critically analyze behavior, develop materials, to study administrative models and to examine theory in relation to practice. May be repeated for different experiences. Offered only on a *Pass/No Credit basis.*

HDL 672. INDIVIDUAL STUDY IN HDL. (1-6) Prerequisite: permission of the College of Human Development and Learning. Designed to permit students to conduct action research on selected problems, guided readings, research and individual project work under the direction of a staff member. This course may be repeated for credit with the approval of the College of Human Development and Learning. Offered only on a *Pass/No Credit basis.*

HDL 673. SEMINAR. (1-3) Prerequisite: permission of the College of Human Development and Learning. Designed to provide an opportunity for group analysis of selected areas of interest in human growth and development. Provides for study related to an individual's professional development. Appropriate studies may include independent research, analysis of significant movements and practices, the development of significant ideas or detailed study of the major works of a prominent individual in the field. This course may be repeated for credit with the approval of the College of Human Development and Learning. Offered only on a *Pass/No Credit basis.*

HEALTH AND PHYSICAL EDUCATION

Chairman: Professor Murphy

COURSE DESCRIPTIONS

Courses for Advanced Undergraduates and Graduates

PED 504. PERCEPTUAL-MOTOR DEVELOPMENT. (3) Prerequisite: consent of instructor. A study of the theories, principles and research related to perceptual-motor development of children. Designed to introduce the student to the importance of the perceptual-motor domain of human development.

PED 505. PERCEPTUAL-MOTOR LEARNING. (3) Prerequisite: PED 504 or consent of instructor. A study and analysis of perceptual-motor learning of children and its effect on school performance. Includes the study of perceptual-motor learning theories, diagnostic techniques and selection and analysis of appropriate perceptual-motor learning activities. Special emphasis will be placed on perceptual-motor programs relating to reading, writing and mathematics.

PED 508. PERCEPTUAL-MOTOR THERAPY. (3) Prerequisite: PED 505 or consent of instructor. The observation, evaluation and therapy for children with perceptual-motor dysfunctions. Emphasis is given to the development of understanding approaches and techniques for helping children with perceptual-motor dysfunction. May be repeated for credit, with approval of instructor.

PED 510A. PERCEPTUAL-MOTOR THERAPY LABORATORY. (1)
PED 510B. PERCEPTUAL-MOTOR THERAPY LABORATORY. (2)

PED 510C. PERCEPTUAL-MOTOR THERAPY LABORATORY. (3) Prerequisite or corequisite: PED 504 and/or consent of instructor. Supervised observation, testing and clinical teaching of children with perceptual-motor dysfunction. Course may be repeated for credit with approval of instructor. Three (3) hours is required in laboratory each week for each one (1) hour of credit.

LIBRARY SCIENCE

Director: Associate Professor Boykin

COURSE DESCRIPTIONS

Courses for Advanced Undergraduates and Graduates

LBS 520. ORGANIZATION AND ADMINISTRATION OF THE SCHOOL MEDIA CENTER. (3) Acquisition, processing, circulation of materials; student assistants; records and reports; attendance and scheduling; library quarters and equipment; professional relationships; evaluation of library services.

LBS 522. BASIC REFERENCE SOURCES AND MATERIALS. (3) The selection, evaluation and use of basic reference materials.

LBS 524. READING GUIDANCE AND THE SELECTION OF BOOKS AND MATERIALS FOR CHILDREN. (3) A survey of the development of children's literature, with study of aids and criteria for selection of books and other materials;

principles and objectives of reading guidance for the kindergarten and elementary school pupil.

LBS 526. READING GUIDANCE AND THE SELECTION OF BOOKS AND RELATED MATERIAL FOR YOUNG PEOPLE. (3) A survey of library materials and principles and objectives of reading guidance appropriate for the junior high and high school student, with study of aids and criteria for their selection.

LBS 528. NON-BOOK MATERIALS. (3) A study of the principles and techniques for the selection, acquisition, organization, circulation and use of non-book materials in the library program.

UNIVERSITY REGULATIONS

POLICY CONCERNING DISRUPTION OF THE EDUCATIONAL PROCESS

Section 1. Policies Relating to Disruptive Conduct

The University of North Carolina at Charlotte has long honored the right of free discussion and expression, peaceful picketing and demonstrations, the right to petition and peaceably to assemble. That these rights are a part of the fabric of this institution is not questioned. They must remain secure. It is equally clear, however, that in a community of learning willful disruption of the educational process, destruction of property, and interference with the rights of other members of the community cannot be tolerated. Accordingly, it shall be the policy of this University to deal with any such disruption, destruction or interference promptly and effectively, but also fairly and impartially without regard to race, religion, sex or political beliefs.

Section 2. Definition of Disruptive Conduct

(a) Any faculty member (the term "faculty member," for the purposes of this policy shall include regular faculty members, full-time instructors, lecturers, and all other persons exempt from the North Carolina State Personnel System [Chapter 126 of the General Statutes as amended] who receive compensation for teaching, or other instructional functions, or research at the University), any student, or any employee of the University who is not a faculty member, who, *with the intent to obstruct or disrupt any normal operation or function of the University,* engages, or *incites other to engage,* in individual or collective conduct which destroys or significantly damages any University property, or which impairs or threatens impairment of the physical well-being of any member of the University community, or which, because of its violent, forceful, threatening or intimidating nature or because it restrains freedom of lawful movement, otherwise prevents any member of the University community from conducting his normal activities within the University, shall be subject to prompt and appropriate disciplinary action, which may include suspension, expulsion, discharge or dismissal from the University.

(b) The following, while not intended to be exclusive, illustrate the offenses encompassed herein, when done for the purpose of obstructing or disrupting any normal operation or function of the University: (1) occupation of any University building or part thereof with intent to deprive others of its normal use; (2) blocking the entrance or exit of any University building or corridor or room therein with intent to deprive others of lawful access to or from, or use of, said building or corridor or room; (3) setting fire to or by any other means destroying or substantially damaging any University building or property, or the property of others on University premises; (4) any possession or display of, or attempt or threat to use, for any unlawful purpose, any weapon, dangerous instrument, explosive, or inflammable material in any University building or on the University campus; (5) prevention of, or attempt to prevent by physical act, the attending, convening, continuation or orderly conduct of any University class or activity or of any lawful meeting or assembly in any University building or on the University campus; and (6) blocking normal pedestrian or vehicular traffic on or into the University campus.

(c) Details of the University policy and a description of University procedures in response to disruption of the education process are contained in University Policy Statement # 58, "Policy Concerning Disruption of the Educational Process," which is available for inspection in the Reserve Reading Room of the Atkins Library, the Office of the Chancellor, and most campus administrative offices.

ALCOHOLIC BEVERAGES

State law regulates the possession and use of alcoholic beverages. Excessive and/or inappropiate uses, as defined by state law, are punishable by criminal penalty. Also, because the University community presents a separate and special context in which an environment compatible with academic endeavors must be preserved, additional University regulation of the possession and use of alcoholic beverages on campus is necessary and proper.

The University of North Carolina at Charlotte has adopted Policy Statement #57, "Use and Consumption of Alcoholic Beverages." The text is available for inspection in the Reserve Reading Room of the UNCC Library and most administrative offices. Questions concerning the Policy Statement should be directed to the Office of the Dean of Students.

DRUG ABUSE

The illicit and improper use of certain drugs (for example, cannabis, amphetamines, barbiturates, opiates and hallucinogenic drugs) is incompatible with personal welfare and the pursuit of academic excellence and will not be tolerated by the University. Furthermore, the illicit possession or transfer of these drugs is a state and/or federal offense, and the University will cooperate fully with appropriate authorities in the enforcement of the law.

The fundamental concern and responsibility of the University relative to the abuser of drugs is constructive rehabilitation. Within the limitations imposed by law, the University will promote a program of education and encourage medical consultation in order to meet this responsibility. But it will act firmly through formal disciplinary procedures to control drug abuse in those instances where these measures prove insufficient.

Disciplinary action relative to drug abuse in the University will be administered according to disciplinary procedures established for students, for faculty members, and for nonfaculty employees.

FIREARMS AND OTHER WEAPONS PROHIBITED

State criminal law generally prohibits the open or concealed possession of firearms and other weapons (as defined in the statute) on the property or any public or private educational institution. The law is in full force and effect on the UNCC campus and is strictly observed. See General Statutes of North Carolina, Chapter 14, Article 35 (NCGS 14-269.2).

DIRECTORY

THE UNIVERSITY OF NORTH CAROLINA

Sixteen Constituent Institutions

William Clyde Friday, B.S., LL.B, LL.D., D.C.L. ..... President
Roy Carroll, B.A., M.A., Ph.D. ..... Vice President—Planning
Raymond Howard Dawson, B.A., M.A., Ph.D. ..... Vice President—Academic Affairs
L. Felix Joyner, A.B. ..... Vice President—Finance
Donald L. Stedman, B.A., M.A., Ph.D. ..... Acting Vice President
—Research and Public Service Programs and
Associate Vice President—Academic Affairs
Cleon Franklyn Thompson, B.S., M.S., Ph.D. ..... Vice President
—Student Services and Special Programs
George Eldridge Bair, B.A., M.A., Ph.D. ..... Director of Educational Television
Hugh S. Buchanan, Jr., B.A. ..... Associate Vice President—Finance
John F. Corey, B.S., M.A., Ed.D. ..... Associate Vice President
—Student Services and Special Programs
Kennis R. Grogan, B.S., M.B.A. ..... Associate Vice President—Finance
James L. Jenkins, Jr., A.B. ..... Assistant to the President
John P. Kennedy, Jr., S.B., B.A., M.A., J.D. ..... Secretary of the University
Arnold Kimsey King, A.B., A.M., Ph.D. ..... Assistant to the President
Roscoe D. McMillan, Jr., B.S. . Assistant to the President for Governmental Affairs
Jeanne Margaret McNally, B.S.N., M.A., Ph.D. ..... Associate Vice President
—Academic Affairs
Richard H. Robinson, Jr., A.B., LL.B. ..... Assistant to the President
Robert W. Williams, A.B., M.A., Ph.D. ..... Associate Vice President
—Academic Affairs

The University of North Carolina was chartered in 1789 and opened its doors to students at its Chapel Hill campus in 1795. Throughout most of its history, it has been governed by a Board of Trustees chosen by the Legislature and presided over by the Governor. During the period 1917-1972, the Board consisted of one hundred elected members and a varying number of *ex-officio* members.

By act of the General Assembly of 1931, without change of name, it was merged with The North Carolina College for Women at Greensboro and The North Carolina State College of Agriculture and Engineering at Raleigh to form a multicampus institution designated The University of North Carolina.

In 1963 the General Assembly changed the name of the campus at Chapel Hill to The University of North Carolina at Chapel Hill and that at Greensboro to The University of North Carolina at Greensboro and in 1965, the name of the campus at Raleigh was changed to North Carolina State University at Raleigh.

Charlotte College was added as The University of North Carolina at Charlotte in 1965, and in 1969, Asheville-Biltmore College and Wilmington College became The University of North Carolina at Asheville and The University of North Carolina at Wilmington respectively.

A revision of the North Carolina State Constitution adopted in November 1970 included the following: "The General Assembly shall maintain a public system of higher education, comprising The University of North Carolina and other such institutions of higher education as the General Assembly may deem wise. The General Assembly shall provide for the selection of trustees of The University of North Carolina. . . ." In slightly different language, this provision had been in the Constitution since 1868.

On October 30, 1971, the General Assembly in special session merged, without changing their names, the remaining ten state-supported senior institutions into the University as follows: Appalachian State University, East Carolina University, Elizabeth City State University, Fayetteville State University, North Carolina Agricultural and Technical State University, North Carolina Central University, North Carolina School of the Arts, Pembroke State University, Western Carolina University, and Winston-Salem State University. This merger, which resulted in a statewide multicampus university of sixteen constituent institutions, became effective on July 1, 1972.

The constitutionally authorized Board of Trustees was designated the Board of Governors, and the number was reduced to thirty-two members elected by the General Assembly, with authority to choose their own chairman and other officers. The Board is "responsible for the general determination, control, supervision, management, and governance of all affairs of the constituent institutions." Each constituent institution, however, has its own board of trustees of thirteen members, eight of whom are appointed by the Board of Governors, four by the governor, and one of whom, the elected president of the student body, serves *ex officio*. The principal powers of each institutional board are exercised under a delegation from the Board of Governors.

Each institution has its own faculty and student body, and each is headed by a chancellor as its chief administrative officer. Unified general policy and appropriate allocation of function are effected by the Board of Governors and by the President with the assistance of other administrative officers of the University. The General Administration office is located in Chapel Hill.

The chancellors of the constituent institutions are responsible to the President as the chief administrative and executive officer of The University of North Carolina.

A brief history of The University of North Carolina at Charlotte appears on page 7.

BOARD OF GOVERNORS
THE UNIVERSITY OF NORTH CAROLINA

William A. Johnson ..... Chairman
Mrs. Howard Holderness ..... Vice Chairman
E.B. Turner ..... Secretary

Class of 1981

Hugh Cannon ..... Charleston, S.C.
Philip G. Carson ..... Asheville
T. Worth Coltrane ..... Asheboro
George Watts Hill ..... Durham
Jack O'Kelley ..... Burlington
Mrs. Hugh Morton ..... Linville
David J. Whichard, II ..... Greenville
(One vacancy at time of Printing)

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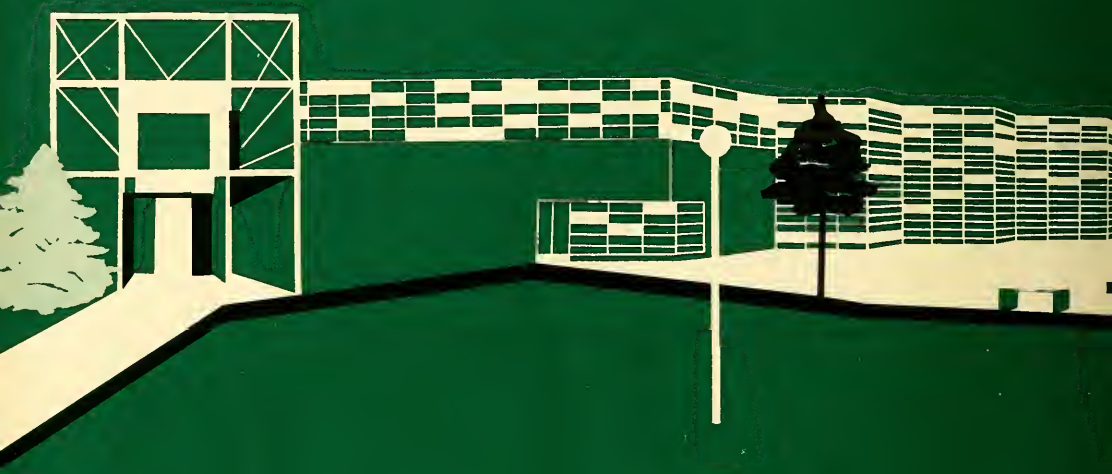
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